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PREFACE

GASTROENTEROLOGY ABSTRACTS and CITATIONS is a publication of the National Institute of Arthritis, Metabolism and Digestive Diseases. This specialized information medium has been initiated to fill an existing great need in the field of gastroenterology and to assist the Institute in meeting its obligations to foster and support laboratory and clinical research into the nature, causes, and therapy of diseases of the gastrointestinal tract. Publication GASTROENTEROLOGY ABSTRACTS and CITATIONS makes available citations of all current papers relevant to this field from medical journals published throughout the world. Approximately one-third of the citations dealing with the major aspects of gastroenterology have accompanying abstracts.

The issuing of GASTROENTEROLOGY ABSTRACTS and CITATIONS under the auspices of the National Institute of Arthritis, Metabolism, and Digestive Diseases will provide a much needed current awareness tool to scientists and will facilitate greater integration of research and clinical efforts in this field. The number and great diversity of publications in the area of gastroenterology makes it imperative that an appropriate service be available to investigators and practitioners so that they may be apprised of progress with a minimum of delay. Our aim is to provide the readers with a readily systematized complilation of current published work. The publication will provide the greatest usefulness if these interested investigators will contribute their ideas and comments for consideration whenever possible.

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CONTENTS

Abstracts, Citations — Page

PRE-CLINICAL SCIENCES

Morphology, Cellular Structure and Histochemistry . . . 0001-0016 1
Absorption--Excretion--Transport. 0017-0046 3
Motility. 0047-0076 6
Secretion and Metabolism 0077-0081 8
  Stomach. 0082-0127 9
  Pancreas 0128-0137 12
  Hepatobiliary Tract. 0138-0178 15
  Intestine. 0179-0187 18
General 0188-0196 19

DIAGNOSTIC PROCEDURES. 0197-0262 21

GASTROINTESTINAL DISEASES

Esophagus 0263-0310 25
Stomach 0311-0367 28
  Peptic Ulcers. 0368-0429 33
Small Intestine 0430-0477 38
  Regional Enteritis 0478-0483 41
  Malabsorption. 0484-0530 41
Large Intestine 0531-0601 45
  Ulcerative Colitis 0602-0617 50
Pancreas. 0618-0633 52
  Pancreatitis 0634-0649 53
Liver and Biliary Tract 0650-0687 54
  Hyperbilirubinemic States. 0668-0703 57
  Nonviral Hepatitis and Hepatic Injury. 0704-0714 59
  Acute Viral Hepatitis. 0715-0768 60
  Chronic Hepatitis. 0769-0779 64
  Alcoholic Liver Disease. 0780-0790 66
  Cirrhosis. 0791-0810 67
  Gallbladder and Biliary Tract Diseases 0811-0836 70

General 0837-0888 71
  Parasitology 0889-0908 75

AUTHOR INDEX

SUBJECT INDEX

The Secretary of the Department of Health, Education, and Welfare has determined that the publication of this periodical is necessary in the transaction of the public business required by law of this Department. Use of funds for printing this periodical has been approved by the Director of the Office of Management and Budget through April 30, 1975.

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NOTE

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LANGUAGE ABBREVIATIONS

Afr.	Afrikaans	It.	Italian
Ar.	Arabic	Jap.	Japanese
Bul.	Bulgarian	Kor.	Korean
Ch.	Chinese	Latv.	Latvian
Cz.	Czech	Lith.	Lithuanian
Dan.	Danish	Nor.	Norwegian
Dut.	Dutch	Pol.	Polish
E.	English	Por.	Portuguese
Eston.	Estonian	Rum.	Rumanian
Fin.	Finnish	Rus.	Russian
Fl.	Flemish	Ser.	Serbo-Croatian
Fr.	French	Sl.	Slovak
Ger.	German	Sp.	Spanish
Gr.	Greek	Sw.	Swedish
Heb.	Hebrew	Th.	Thai
Hun.	Hungarian	Turk.	Turkish
Ic.	Icelandic	Uk.	Ukrainian
In.	Indonesian	Viet.	Vietnamese

ABBREVIATIONS USED IN ABSTRACTS

ACTH	adrenocorticotropic hormone	mC,µC	milli-,microcurie(s)
ADP	adenosine diphosphate	mg	milligram(s)
AMP	adenosine monophosphate	min	minute(s)
ATP	adenosine triphosphate	ml	milliliter(s)
BSP	sulfobromophthalein	mm	millimeter(s)
C	degrees centigrade	MTD	maximum tolerated dose
cm	centimeter(s)	ng	nanogram (10^{-9})
CNS	central nervous system	pg	picogram (10^{-12})
cpm	counts per minute	p.o.	orally
DNA	deoxyribonucleic acid	ppm	parts per million
e.g.	for example	r	Roentgen
g	gram(s)	RBC	red blood cells (erythrocytes), red blood count
µg	microgram(s)	resp.	respectively
hr	hour(s)	Rev.	review (only in citations)
i.m.	intramuscular	RNA	ribonucleic acid
i.p.	intraperitoneal	s.c.	subcutaneous
IU	international unit(s)	sec	second(s)
i.v.	intravenous	SGOT	serum glutamic-oxalacetic transaminase
kg	kilogram(s)	SGPT	serum glutamic-pyruvic transaminase
LD_{50}	median lethal dose(s)	U	unit(s)
LDH	lactic acid dehydrogenase	UV	ultraviolet
m	meter(s)	WBC	white blood cells (leukocytes), white blood count
M	molar	yr	year(s)
mEq	milliequivalent(s)		
mM	millimolar		
µM	micromolar		

PRE-CLINICAL SCIENCES

MORPHOLOGY, CELLULAR STRUCTURE AND HISTOCHEMISTRY

0001 EFFECTS OF PENTAGASTRIN STIMULATION ON HUMAN PARIETAL CELLS. AN ELECTRON MICROSCOPIC STUDY WITH QUANTITATIVE EVALUATION OF CYTOPLASMIC STRUCTURES. *(E.)* Frexinos, J.; Louis, A.; Ribet, A. (Cent. Microsc. Electron. Appl. Biol., Univ. Paul Sabatier, Toulouse-Rangueil, France). *Am. J. Dig. Dis.* 16(12):1065-1074, 1971.

A total of 20 oral biopsies were taken from 10 subjects. After acid secretion was stimulated (with pentagastrin (6μg/kg 1 hr i.v.), the microvilli and plasmalemmae of the apical and canalicular surfaces appear to increase markedly, whereas tubulovesicles become less prominent. Golgi complexes are frequently dilated and basal infoldings are increased, connecting, sometimes with vesicles in the cytoplasm. After pentagastrin stimulation, however, all parietal cells in a biopsy do not exhibit the same state of activity. Approximately 5% of the parietal cells resemble more closely, those obtained from the nonacid-secreting gastric mucosa. Cytoplasmic structures were evaluated quantitatively in 5 subjects. Previous tests on these patients had demonstrated their normal status from a gastroenterologic point of view. For each patient, 2 groups of 14 cells each were measured: the first group contained cells in the resting stage; the second group contained cells immediately after stimulation. A total of 140 cells (70 before and 70 after the injection of pentagastrin) was studied. Statistical analysis, in all cases, confirmed the significant variations of tubulovesicles and microvilli, but failed to demonstrate the increased number of mitochondria and canaliculi and the decrease in hyaloplasmic space in three of the subjects.

0002 SMALL INTESTINAL VILLOUS PATTERN AND MUCOSAL DYNAMICS IN HEALTHY JAMAICANS. *(E.)* Da Costa, L. R. (Hotel Hosp., Kingston, Ont., Canada). *Am. J. Dig. Dis.* 17(2):105-110, 1972.

Intestinal biopsy specimens from 20 Jamaican subjects who had no evidence of gastrointestinal disease were examined under the dissecting microscope and histologically. The appearances were normal in all 20. The most common finding was a mixture of finger- and leaf-shaped villi. Histologically, the biopsy specimens were also normal, consisting of long slender villi with short crypts and very few inflammatory cells. The crypt length, adult crypt cell ratio, mitotic index and turnover time were normal. These findings indicate that the set of circumstances causing and perpetuating the abnormalities seen in the jejunal biopsies of subjects living in the tropics do not exist in Jamaica, and that the small intestinal villous appearance and mucosal dynamics in the healthy Jamaican Negro are similar to those of Europeans and North Americans.

0003 ENDOCRINE CELLS IN THE NORMAL HUMAN STOMACH *(E.)* Rubin, W. (Med. Col. Pennsylvania, Philadelphia). *Gastroenterology* 62(4):784-800, 1972.

The fine structure of endocrine cells in normal human stomachs was studied on 34 gastric biopsy specimens. Four morphological types could be identified. Enterochromaffin-like cells constituted the majority of endocrine cells observed in each section of the body, but were not positively identified in the pylorus. Gastrin cells constituted the majority of endocrine cells observed in most sections of the pylorus, but were not observed in the body. Enterochromaffin cells were infrequent in the body, but were readily observed in the pylorus, especially in the lower portions of the glands. D-shaped cells were scattered in both the body and pylorus in moderate numbers. From 5 to 20% of endocrine cells observed in each section could not be classified. The significance of the different morphological types of gastric endocrine cells remains uncertain.

0004 ELECTRON MICROSCOPIC IDENTIFICATION OF THE GASTRIN CELL OF THE HUMAN ANTRAL MUCOSA BY MEANS OF IMMUNOCYTOCHEMISTRY. *(E.)* Greider, M.H., Steinberg, V.; McGuigan, J.E. (Washington Univ. Sch. Med., St. Louis, Mo.). *Gastroenterology* 63(4):572-583, 1972.

Using γG-immunoglobulins-containing antibodies to human gastrin I labeled with horseradish peroxidase, the human antral gastrin cell was identified and characterized by light and electron microscopy. The gastrin cells identified by this method were shown to be identical cells to those previously described using fluoresceinated antibodies to human gastrin I. The gastrin cells contained specifically stained round, cytoplasmic granules 150 to 200 nm in diameter. The other endocrine-like cells of the human antrum were identified and ultrastructural criteria were established for distinction of these cells from the gastrin cells. Differences of opinion on the identification of the human gastrin cell are probably due to variations in experimental methodology and sampling.

0005 ULTRASTRUCTURAL CHANGES IN THE SMALL INTESTINE INDUCED BY ETHANOL. *(E.)* Rubin, E., Rybak, B.J.; Lindenbaum, J.; Gerson, C.D.; Walker, G.; Lieber, C.S. (Dept. Pathol., Mt. Sinai Sch. Med. of the City University of New York, N.Y.). *Gastroenterology* 63(5):801-814, 1972.

Striking ultrastructural changes in the small intestine were produced by chronic administration of ethanol as isocaloric replacement of carbohydrate to volunteers. Mitochondrial abnormalities and dilation of the endoplasmic reticulum and cisternae of the Golgi apparatus were observed in jejunal and ileal villi of rats. Similar changes were found in cells of the crypts and villi of human volunteers after ethanol administration. Human specimens also exhibited focal cytoplasmic degradation. These alterations are similar to those produced by ethanol in the liver and suggest that ethanol is injurious to the small intestine in the absence of nutritional deficiency, producing sublethal toxic damage.

0006 TOPOGRAPHIC AND SUBCELLULAR ANATOMY OF THE GUINEA PIG GALLBLADDER.
(E.) Mueller, J.C., Jones, A.L.; Long, J.A. (VA Hosp., San Francisco, Calif.). *Gastroenterology* 63(5):856-868, 1972.

The normal guinea pig gallbladder, fixed in the filled or empty state, was examined by scanning and transmission electron microscopy and light microscopy. Striking differences in the epithelial morphology, were found to be dependent on the state of filling of the gallbladder, "Folds," "crests," and "bays," previously described, disappear when the gallbladder is fixed in its usual filled state. Fixation of the gallbladder in the filled state allowed the detection of cryptlike glands not easily appreciated in the empty, relaxed state. These glands contained cells which resembled intestinal goblet cells, were periodic acid-Schiff positive, and, with scanning electron microscopy, appeared to be discharging material. The lateral epithelial cell membrane, thought to be the site of active sodium chloride transport, contains microfolds which do not resemble microvilli. With scanning electron microscopy, the labyrinthine canals that exist between the epithelial cells can be fully appreciated. A correlative approach to morphologic studies offers new insight into the structure of the gallbladder.

0007 EFFECT OF DIABETES ON INTESTINAL DISACCHARIDASE ACTIVITIES. *(E.)* Younoszai, M. K.; Schedl, H. P. (Univ. Iowa Coll. Med., Iowa City). *J. Lab. Clin. Med.* 79(4):579-86, 1972.

Since intestinal mucosal disaccharidases are crucial for absorption of dietary carbohydrates, disaccharidase activities were compared in control and alloxan diabetic rats. The intestine was examined as proximal, mid, and distal portions divided into mucosal and underlying tissue layers. In both control and diabetic groups more than three-quarters of the activity was in the mucosal layer. In comparison with matched controls, total activities in diabetics at 8 days after alloxan injection were nearly doubled for lactase and maltase and tripled for sucrase. Maltase and sucrase activities were increased in all three segments, but the increase in lactase was chiefly in the proximal segment. Thus, the normal longitudinal pattern of high activity in proximal segments was maintained when activity increased in diabetics. Since intestinal mass increased by only 17 per cent in diabetics, most of the increase in disaccharidases was in specific activities of the enzymes.

0008 EFFECT OF DIETARY PROTEIN AND FEEDING SCHEDULE ON HEPATIC POLYSOME PATTERN IN THE RAT. *(E.)* Symmons, R.A., Maguire, E.J.; Rogers, Q.R. (Sch. Vet. Med., Univ. California, Davis). *J. Nutr.* 102(5):639-646, 1972.

Rats (male, albino, 140 to 160 g) were adapted to a feeding period of either 2 hours (meal-fed) or 16 hours (control-fed) per day and fed 0, 6, 15, 30 or 75% casein. Meal-fed rats were adapted about 2 weeks and control-fed rats about 1 week prior to determining liver polysome pattern. Meal-fed were fed in the morning, while control-fed rats were fed during the night. Daily, diet-dependent fluctuations in polysome pattern occurred in control-fed rats fed low or moderate amounts of dietary protein, and fluctuations were not abolished by feeding a protein-free diet. Increased levels of protein decreased the magnitude of fluctuation. The time course of oscillation was altered by varying the level of dietary protein. Fluctuations were also observed in meal-fed rats. In both meal-fed and control-fed rats maximal aggregation occurred 4 to 8 hours after feeding was initiated. These results indicate that daily fluctuations in polysome aggregation are diet-dependent rather than circadian or light-cycle dependent, and that increased levels of dietary protein decrease normal fluctuations in hepatic polysome pattern.

0009 HISTOCHEMICAL OBSERVATIONS ON THE MONOAMINERGIC COMPONENT OF THE PANCREAS. *(It.)* Tessitore, V. (Ist. Istol. Embriol., Univ. Palermo, Italy). *Boll. Soc. Ital. Biol. Sper.* 57(22):742-743, 1971.

0010 THE GASTRIN CELL AND THE SECRETIN CELL. *(E.)* Solcia, E. (Dep. Pathol., Univ. Pavia, Italy). *Rend. Gastroenterol.* 4:22-30, 1972.

0011 ULTRASTRUCTURE OF NORMAL HUMAN LIVER. *(E.)* Bhagwat, A. G.; Ross, R. C.; Currie, D. J. (St. Michael's Hosp., Toronto, Canada). *Arch. Pathol.* 93(3):227-239, 1972.

0012 THE CALCIUM BINDING PROTEIN CONTENT IN HUMAN INTESTINAL MUCOSA IN THE PRESENCE OF UREMIA. *(Ger.)* Piazolo, P.; Schleyer, M.; Franz, H. E. (Zentrum Inn. Med. Kinderheil., Univ. Bonn, Germany). *Klin. Wochenschr.* 50:603-605, 1972.

0013 ULTRASTRUCTURAL ALTERATIONS OF THE HEPATIC LOBULE. *(Fr.)* Rouiller, Ch. (Ecole Med., Geneve, Switzerland). *Helv. Med. Acta* 36(2/3):111-122, 1972.

0014 LENGTH OF SMALL INTESTINE (JEJUNO-ILEUM) IN FORMALINE PRESERVED INDIAN CADAVERS. *(E.)* Singh, S.; Mathur, M. M.; Gangrade, K. C.; Rao, N. S. N. (Coll. Med. Sci., B. H. U., Varanasi, India). *J. Anat. Soc. India* 20(3):45-51, 1971.

0015 HISTOCHEMICAL OBSERVATIONS ON CHOLINESTERASE ACTIVITY IN THE GASTRO-INTESTINAL TRACT INCLUDING THE PANCREAS IN MAN AND SOME MAMMALS. *(E.)* Naik, N. T. (Med. Coll., Bellary, Mysore State, India). *J. Anat. Soc. India* 20(3):126-132, 1971.

0016 PREPARATIVE ULTRACENTRIFUGATION [OF LIVER HOMOGENATES] WITH POTASSIUM CHLORIDE, GLUCOSE, AND SUCROSE SOLUTIONS. COMPARATIVE LIGHT- AND ELECTRON-MICROSCOPE STUDIES. *(Ger.)* Leuschner, U.; Wildgrube, H. J. (Zentrum Inn. Med., Johann-Wolfgang-Goethe-Univ., Frankfurt/Main, Germany). *Z. Gastroenterol.* 10(3):197-207, 1972.

See also 0061, 0084, 0086, 0266, 0270, 0287, 0293, 0317, 0336, 0435, 0455, 0808

ABSORPTION–EXCRETION–TRANSPORT

0017 INHIBITION OF IRON ABSORPTION BY CHOLESTYRAMINE. DEMONSTRATION OF DIMINISHED IRON STORES FOLLOWING PROLONGED ADMINISTRATION. *(E.)* Thomas, F.B., Salsburey, D.; Greenberger, N.J. (Ohio State Univ. Hosp., Columbus). *Am. J. Dig. Dis.* 17(3):263-269, 1972.

Cholestyramine, an anionic exchange resin, binds inorganic and hemoglobin iron *in vitro* and inhibits the absorption of these compounds from the rat small intestine, but long-term effects on iron stores are unknown. Rats were fed diets of standard rat chow or standard rat chow containing either 2 or 5% cholestyramine for 6 months. In the 5% cholestyramine group the hematocrit and hemoglobin values were significantly lower as compared to controls. Serum iron values in the 5% cholestyramine groups were significantly less than the control group. Control-group nonheme iron levels in liver, spleen, and duodenum of 206, 1482, and 12.5 μg/g contrasted with respective levels of 172, 1266 and 11.7 μg/g in the 2% cholestyramine group and 143, 1031, and 10.2 μg/g respectively in the 5% cholestyramine-treated group. Serum vitamin B12 levels in cholestyramine-fed rats were also significantly reduced in comparison to controls (256 vs. 404 pg/ml). Thus prolonged cholestyramine administration appears to deplete iron stores and might produce iron-deficiency anemia.

0018 THE EFFECT OF pH ON THE INTESTINAL ABSORPTION OF TELEPAQUE. *(E.)* Taketa, R.M., Berk, R.N.; Lang, J.H.; Lasser, E.C.; Dunn, C.R. (Dep. Radiol., Univ. California, San Diego). *Am. J. Roentgenol.* 114(4):767-772, 1972.

Acute *in vivo* studies were performed in 11 female and 2 male mongrel dogs anesthetized with pentobarbital sodium. ^{125}I-labeled Telepaque (iopanic acid) with a specific activity of 10,000-15,000 counts/min/mg and a concentration of 10 mg/ml was buffered to various pH values, and 25 ml aliquots were instilled into isolated 15-cm segments of the duodenum, jejunum, ileum, and colon through a Foley catheter. Bile flow was maintained at 2-3 ml/15 min by i.v. infusion of 1.5% sodium taurocholate, and normal saline containing 44 mEq/liter sodium bicarbonate was infused to ensure fluid balance. A peak blood concentration of 0.18 mg/100 ml Telepaque was obtained 30 min after instillation of a solution at pH 3.41. Telepaque absorption increased with increasing pH, resulting in a peak blood concentration of 0.58 mg/ml at pH 10.21. Increased absorption was also manifested by increased concentration and output of Telepaque excreted in the bile. No preferential site of Telepaque absorption was observed in either the small or large intestine. *In vitro* studies demonstrated that Telepaque dissolves very slowly below pH 8 or 9 and precipitates out below pH 7.5. These findings suggest that nonvisualization of the gallbladder in oral cholecystography on normal subjects could results from increased acidity in the stomach and small intestine.

0019 EFFECTS OF CHOLECYSTOKININ AND METOCLOPRAMIDE ON JEJUNAL MOVEMENTS OF WATER AND ELECTROLYTES AND ON TRANSIT TIME OF LUMINAL FLUID IN MAN. *(E.)* Matuchansky, C., Huet, P. M.; Mary, J. Y.; Rambaud, J. C.; Bernier, J. J. (Hop. St.-Lazare, Paris, France). *Eur. J. Clin. Invest.* 2:169-175, 1972.

The effects of cholecystokinin and metocopramide were studied in 11 normal subjects, each one being his own control. An intestinal perfusion technique with a four-lumen tube was used. This allowed a simultaneous determination of mean transit time and absorption rate of water and electrolytes through a 35-cm segment of jejunum. Cholecystokinin induced a significant decrease in mean transit time of fluid along the test segment. This effect was primarily due to a striking reduction (40% or more) in the mean diameter of the intestinal lumen. Simultaneously there was a significant increase in net water, sodium and chloride secretion into the lumen, whereas net transport of potassium and bicarbonate was not affected. The lumen-to-blood unidirectional flux of sodium was obviously reduced but the opposite flux did not significantly change. Similar changes in water and electrolyte movements were observed in subjects in whom transit time was primarily decreased by metoclopramide. A close correlation was found between changes in transit time and net water and sodium transport into the lumen, in both cholecystokinin and metoclopramide studies. These results suggest that intestinal hypermotility may result, *per se*, in an increased secretion rate of water and electrolytes across the proximal small bowel.

0020 ABSORPTION OF MEDIUM-CHAIN TRIGLYCERIDES IN ANIMALS WITH PANCREATIC ATROPHY. *(E.)* Valdivieso, V. D. (Sch. of Med., Catholic Univ. of Chile, Santiago) *Am. J. Dig. Dis.* 17(2):129-137, 1972.

Rats with surgically induced atrophy of the exocrine pancreas were studied to determine the mechanisms of medium-chain triglycerides digestion and absorption from the gut. Both the upper jejunum and cecum of the rats digested and absorbed significant amounts of triglycerides, but by different mechanisms. In the jejunum, medium-chain triglycerides are not hydrolyzed in the lumen and diffuse intact into the epithelial cell. In the cell, they are partially hydrolyzed by an intestinal lipase and are transported into portal blood partly as intact triglyceride and partly as free fatty acids. In the cecum, the triglycerides are hydrolyzed in the lumen. Free fatty acids released in the lumen are rapidly absorbed by the cecal mucosa, and diffuse into the portal plasma. Colonic digestion and absorption of medium chain triglycerides may explain the reduction of steatorrhea observed in pancreatectomized patients, or subjects with advanced pancreatic insufficiency, when the usual dietary fats are substituted by medium-chain triglycerides.

0021 STUDIES ON FOLIC ACID ABSORPTION IN THE RAT. II. THE ABSORPTION OF CRYSTALLINE PTEROYLGLUTAMIC ACID FROM SELECTED SMALL INTESTINE SEGMENTS. *(E.)* Izak, G,; Galevski, K.; Grossowicz, N.; Jablonska, M.; Rachmilewitz, M. (Hadassah Univ. Hosp., Jerusalem, Isreal). *Am. J. Dig. Dis.* 17(7):599-602, 1972.

Absorption of pteroylglutamic acid from selected intestinal segments was studied in normal, folate-depleted and folate-loaded rats. Using tritium-labeled pteroylglutamic acid, it was found that the jejunum is the most important site of folic acid absorption in the rat; removal or bypass of the jejunum reduced the folate absorption five-to-sixfold. Folate absorption tests in selected jejunal segments have shown that the absorption capacity was evenly distributed throughout the length of the jejunum and that a 25- to 40-cm length was required for normal absorption. The ability of the ileum to absorb labeled pteroylglutamic acid more than doubled in folate-depleted rats.

0022 EFFECT OF INTRALUMINAL pH ON ABSORPTION RATES OF LEUCINE, WATER, AND ELECTROLYTES IN HUMAN JEJUNUM. *(E.)* Adibi, S.A., Ruiz, C.; Glaser, P.; Fogel, M.R. (Montefiore Hosp., Pittsburgh, Pa.) *Gastroenterology* 63(4):611-618, 1972.

A jejunal segment of normal subjects was perfused through a triple lumen tube at 15 ml per min with solutions containing either 30 mM mannitol or 30 mM leucine, plus 140 mM NaCl, 0.4% polyethylene glycol, and varying amounts of HCl. The lengths of the mixing and test segments were 10 and 20 cm, respectively. When the *p*H of leucine test solutions was lowered from 6.90 to either 3.00 or 2.50, the *p*H of fluids entering the test segment became acidic but the *p*H of fluids leaving the segment remained unaffected. Moreover, no remarkable differences in the absorption rates of leucine, water, or electrolytes were noted. Further reduction in the *p*H of the test solution to 2.25 resulted in acidic fluids both entering and leaving the test segment and in the abolition of net absorption of water, Na^+, and Cl^-. Leucine absorption was only modestly reduced (21%). Reinfusion of a test solution with a *p*H of 6.90 promptly reversed all changes. When leucine was not added to the test solutions, a greater amount of HCl was required to maintain an acidic *p*H in the test segment, but the net movements of water and NaCl from the mannitol solution were still abolished. Although Na^+ and water absorptions were markedly greater from leucine than from mannitol solution, this effect was no longer present when the test segment was acidified. The results of these studies indicate that the buffering capacity of a jejunal segment is overwhelmed when the *p*H of acidic solutions presented to its mucosa is lowered below a certain narrow range. When this decompensation occurs, transport processes are markedly impaired; the interaction between Na^+ and leucine transport is *p*H-dependent.

0023 EFFECT OF TAUROCHOLATE ON ELECTRICAL POTENTIAL DIFFERENCE ACROSS RAT SMALL INTESTINE. *(E.)* Wall, M. J., Baker, R. D. (Univ. of Texas Med. Branch, lveston). *Life Sci. Part I* 11:375-386, 1972.

The transmural electrical potential difference across rat small intestine incubated *in vitro* was enhanced by taurocholate. Stimulation was much greater in terminal ileum (where taurocholate is actively transported) than in upper jejunum. Bile depletion increased the electrical response in the terminal ileum, but fasting the rats for 24 hr decreased it. Fasting also decreased taurocholate transport by terminal ileum, and bile depletion is already known to increase transport. The correlation between electrogenicity and transport at different positions along the intestine and when the animals are either fasted or depleted of bile suggests a functional relationship between the electrical effect of taurocholate and its transport.

0024 THE EFFECTS OF BILE SALT AND RAW BILE ON THE INTESTINAL ABSORPTION OF MICELLAR FATTY ACID IN THE RAT. *(E.)* Rampone, A. J. (Univ. Oregon Med. Sch., Portland). *J. Physiol.* 222:679-690, 1972.

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0026 THE RESPONSE OF INTESTINAL CALCIUM TRANSPORT TO 25-HYDROXY AND 1,25-DIHYDROXY VITAMIN D IN HEPHRECTOMIZED RATS. *(E.)* Boyle, I. T., Miravet, L.; Gray, R. W.; Holick, M. E.; Delunca, H. F. (Sch. Med., Univ. Wisconsin, Madison). *Endocrinology* 90(3):605-608, 1972.

0027 CHANGES IN THE INTESTINAL TRANSPORT OF SODIUM INDUCED BY EXPOSURE OF GOLDFISH TO A SALINE ENVIRONMENT. *(E.)* Ellory, J. C., Lahlou, B.; Smith, M. W. (A.R.C. Inst. Anim. Physiol., Babraham, Cambridge, England). *J. Physiol.* 222:497-509, 1972.

0028 LOWERED GLUCOSE TOLERANCE IN THE SAND RAT *(Psammonys obesus)* RESULTING FROM ESOPHAGEAL INTUBATION. *(E.)* Mikat, E. M., Hackel, D. B.; Cruz, P. T.; Lebovitz, H. E. (Dept. Pathol. Med., Duke Univ., Durham, N. C.). *Proc. Soc. Exp. Biol. Med.* 139(4):1390-1391, 1972.

0029 AN OXYGENATION-PERFUSION METHOD FOR IN VITRO TRANSPORT STUDIES ON THE INTESTINES OF LARGE MAMMALS. *(E.)* Whitten, E. H., Phillips, R. W. (Dep. Physiol. Biophys., Colorado State Univ., Fort Collins). *Am. J. Dig. Dis.,* 16(10):915-919, 1971.

0030 METABOLIC REQUIREMENTS FOR SODIUM TRANSPORT IN THE RAT'S ILEUM. *(E.)* Strombeck, D. R.; Ingraham, R. C. (Univ. Illinois Coll. Med., Chicago). *Proc. Soc. Exp. Biol. Med.* 139(2):377-382, 1972.

0031 EFFECTS OF SECRETIN AND GLUCAGON ON INTESTINAL TRANSPORT OF IONS AND WATER IN THE RAT. *(E.)* Hubel, K. A. (Univ. Iowa Coll. Med., Iowa City). *Proc. Soc. Exp. Biol. Med.* 139(2):656-658, 1972.

0032 EFFECT OF DIURETICS ON SODIUM AND POTASSIUM TRANSPORT IN THE RAT'S ILEUM. *(E.)* Strombeck, D. R.; Ingraham, R. C. (Univ. Illinois Coll. Med., Chicago). *Proc. Soc. Exp. Biol. Med.* 139(2):383-386, 1972.

0033 NORMAL INCORPORATION OF ORAL IRON INTO INTESTINAL FERRITIN IN INFLAMMATION. *(E.)* Schade, S. G. (Dep. Med., Univ. Illinois, Chicago). *Proc. Soc. Exp. Biol. Med.* 139(2):620-622, 1972.

0034 INTESTINAL ABSORPTION OF CALCIUM. *(E.)* Aviole, L. V. (Washington Univ. Sch. Med., St. Louis, Mo.). *Arch. Intern. Med.* 129(2):345-355, 1972.

0035 ACTIVE TRANSPORT OF AMINO ACIDS AND SUGARS. *(E.)* Curran, P. F. (Yale Univ. Sch. Med., New Haven, Ct.). *Arch. Intern. Med.* 129(2):258-269, 1972.

0036 UPTAKE OF SUGARS BY MUCOSA OF RAT COLON. *(E.)* Heaton, J. W. (Stanford Univ. Sch. Med., Palo Alto, Calif). *Am. J. Dig. Dis.* 17(1):7-16, 1972.

0037 EFFECT OF CHOLESTYRAMINE ON TOXICITY AND ABSORPTION. *(E.)* Nolan, J. P.; Ali, M. V. (State Univ. N. Y., Dep. Med., Buffalo). *Am. J. Dig. Dis.* 17(2):161-166, 1972.

0038 EVIDENCE FOR THE ABSORPTION OF IMMUNOREACTIVE INTRINSIC FACTOR INTO THE INTESTINAL EPITHELIAL CELL DURING VITAMIN B_{12} ABSORPTION. *(E.)* Rothenberg, S. P.; Weisberg, H.; Ficarra, A. (N. Y. Med. Coll., N. Y.). *J. Lab. Clin. Med.* 79(4):587-597, 1972.

0039 INTESTINAL CALCIUM ABSORPTION AND CALCIUM-BINDING PROTEIN: INFLUENCE OF DIETARY CALCIUM. *(E.)* Omdahl, J. L.; Thornton, P. A. (Dep. Biochem., Univ. Wisconsin, Madison). *Proc. Soc. Exp. Biol. Med.* 139(3):975-980, 1972.

0040 MONOSACCHARIDE INDUCTION OF 3-0-METHYL GLUCOSE TRANSPORT THROUGH THE RAT JEJUNUM. *(E.)* Roy, C. C.; Dubois, R. S. (Univ. Colorado, Med. Cent., Denver). *Proc. Soc. Exp. Biol. Med.* 139(3):883-886, 1972.

0041 UPTAKE OF MICELLAR LIPIDS BY SMALL INTESTINAL SEGMENTS (UNDER DIFFERENT EXPERIMENTAL CONDITIONS). *(E.)* Sylven, C. (Chem. Cent., Univ. Lund, Sweden). *Acta Physiol. Scan.* 83(3):289-299, 1971.

0042 TRITIATED DIGOXIN XVI. GASTRIC ABSORPTION. *(E.)* Hall, W. H.; Doherty, J. E. (Univ. Arkansas Sch. Med., Little Rock). *Am. J. Dig. Dis.* 16(10):903-908, 1971.

0043 INTESTINAL CALCIUM ABSORPTION: CONCURRENT USE OF ORAL AND INTRAVENOUS TRACERS AND CALCULATION BY THE INVERSE CONVOLUTION METHOD. *(E.)* Szymendera, J.; Heaney, R. P.; Saville, P. D. (Inst. Oncol., Warsaw, Poland). *J. Lab. Clin. Med.* 79(4):570-578, 1972.

0044 STUDIES ON FOLIC ACID ABSORPTION IN THE RAT. I. *(E.)* Izak, G.; Galevski, K.; Grossowicz, N.; Jablonska, M.; Rachmilewitz, M. (Hadassah Univ. Hosp., Jerusalem, Israel). *Am. J. Dig. Dis.* 17(7):591-598, 1972.

0045 EFFECT OF AVITAMINOSIS A AND DIETARY REGIME ON INTESTINAL TRANSFER AND HEPATIC CONCENTRATION OF FREE AMINO ACIDS. *(E.)* Varnell, T. R. (Div. Animal Sci., Univ. Wyoming, Laramie, Wyoming). *Int. J. Vitam. Nutr. Res.* 42(2):271-277, 1972.

0046 EFFECT OF AGE ON GASTROINTESTINAL ABSORPTION (Fe, Sr, Pb) IN THE RAT. *(E.)* Forbes, G. B.; Reina, J. C. (Dept. Pediatr., Univ. Rochester Sch. Med. and Dentistry, Rochester, N.Y.). *J. Nutr.* 102:647-652, 1972.

See also 0145, 0435, 0505, 0508, 0509

0047 REFLEX RELAXATION OF THE STOMACH ELICITED FROM RECEPTORS LOCATED IN THE HEART. AN ANALYSIS OF THE RECEPTORS AND AFFERENTS INVOLVED. *(E.)* Abrahamson, H., Thoren, P. (Dep. Physiol., Univ. Goeteborg, Sweden). *Acta Physiol. Scand.*, 84:197-207, 1972.

Electrical afferent stimulation of the right cardiac nerve promptly elicited marked hypotension, bradycardia and relaxation of the stomach in cats anesthetized with chloralose. Stimulation threshold and conduction velocity measurements indicated that the stimulated afferents were unmyelinated fibres. The circulatory and gastric responses were abolished by cervical vagal blockade on the stimulation side. Administration of nicotine intrapericardially or veratrum alkaloids i.v. produced similar circulatory and gastric responses as the electrical nerve stimulation. The effects of veratrum were markedly reduced upon application of a local anesthetic in the pericardial cavity. Reflex gastric relaxation was also elicited in response to occlusion of the ascending aorta or mechanical stimulation of the left ventricle. With occlusion of the pulmonary artery only slight gastric responses were obtained during the occlusion. Pronounced gastric responses were recorded upon occlusion of a coronary artery, the effect being abolished by section of the vagi in the neck. Marked reflex relaxation of the stomach can be elicited from heart receptors, probably located in the left ventricle and with unmyelinated afferents in the vagi, suggesting that the described reflex gastric response may form part of a vomiting pattern.

0048 THE PHARYNGOESOPHAGEAL CLOSURE MECHANISM: A MANOMETRIC STUDY. *(E.)* Winans, C.S. (The Pritzker Sch. Med., Univ. Chicago, Chicago, Ill.). *Gastroenterology* 63(5):768-777, 1972.

Using a special eight-lumen recording catheter with lateral orifices spaced at 45° intervals around the circumference of the catheter, the pharyngoesophageal high pressure zones of 18 human subjects were investigated. Similar pressures were recorded from all orifices regardless of radial orientation in the body of the esophagus and in the pharynx. Within the high pressure zone, however, recorded pressure was strikingly related to orifice position. Greatest pressures (average 100 mm Hg) were recorded from orifices directed anteriorly and posteriorly, while least pressures (average 33 mm Hg) were detected by orifices pointing to the subjects' right and left. In contrast, study of the anal sphincters of 5 subjects with the eight-lumen recording system revealed similar pressures regardless of orifice orientation; the results indicate that the anus is closed by an intrinsic, circular sphincter. In contrast pharyngoesophageal closure is achieved by a force not uniformly distributed about the circumference. This finding is best explained by the effect of an extrinsic structure, the cricopharyngeus muscle.

0049 LOWER ESOPHAGEAL SPHINCTER PRESSURE CHANGES AFTER FOOD INGESTION. *(E.)* Neben, O.T.; Castell, D.O. (Naval Hosp., Philadelphia, Pa.). *Gastroenterology* 63(5):778-783, 1972.

Since the lower esophageal sphincter primarily acts to prevent reflux of gastric contents in the esophagus, changes in lower esophageal sphincter strength after the ingestion of various foods should be of considerable interest. Pressure in the lower esophageal sphincter was recorded continuously in normal subjects using an infused open-tipped system after test meals consisting of equicaloric quantities of either protein, carbohydrate, or fat in a total volume of 150 cc. After ingestion of ground beef, consistent increases in lower esophageal sphincter pressure were recorded. This effect was eradicated by acidifying the ground meat meal to a *p*H of 1.2 to 1.3. After glucose ingestion, slight but significant increases in lower esophageal sphincter pressure were found, whereas ingestion of a corn oil meal resulted in a decrease in lower esophageal sphincter pressure. Even greater decreases in lower esophageal sphincter pressure was produced by intraduodenal fat. Intraduodenal acidification and exogenous secretin resulted in minimal decreases in sphincter pressure, with much greater decreases in pressure noted after subsequent intraduodenal instillation of fat. The increased pressure after protein and its inhibition by acidification suggest a mechanism through antral gastrin release. The slight rise in pressure after glucose may indicate a minimal gastrin effect. An enterogastrone other than secretin most likely produces the pressure decreases following a fat meal.

0050 THE SLOWING OF GASTRIC EMPTYING BY FOUR STRONG ACIDS AND THREE WEEK ACIDS. *(E.)* Hunt, J. N.; Knox, M. T. (Guy's Hosp. Med. Sch., London, England). *J. Physiol.* 222:187-208, 1971.

Test meals of 750 ml water containing a range of concentration of various acids plus a phenol red marker were instilled into the stomachs of sixteen healthy subjects. The gastric contents were withdrawn at a predetermined time. Acids used were hydrochloric, nitric, sulphuric, cyclamic (cyclohexylsulphamic), tartaric, L-ascorbic and citric acids. The greater the concentration of an acid in the instilled meal, the greater was the volume of meal recovered after a fixed interval. For the weak acids, tartaric, ascorbic and citric, the concentrations which gave a recovery of 450 ml out of the 750 ml instilled, increased with increase in the molecular weight of the acid. For the strong acids, hydrochloric, nitric, sulphuric and cyclamic, the concentrations which gave a recovery of 450 ml out of the 750 ml instilled, were approximately equal, and were less than those for weak acids. However, strong acids with high molecular weights were slightly more effective in slowing gastric emptying than were those with low molecular weights. The approximate equality of effectiveness of nitric, sulphuric and cyclamic acids to hydrochloric acid may be due to the presence of chloride ion in the duodenal contents, so that all the strong acids instilled produce an environment of hydrochloric acid around the receptor. A model for a duodenal receptor responding to acids is proposed.

0051 A TECHNIQUE FOR STUDYING PROPULSION AND THE DISPLACEMENT OF CONTENTS IN THE DUODENUM AND PROXIMAL JEJUNUM. *(E.)* Borgstroem, S.; Arborelius, M. (Malmoe Gen. Hosp., Malmoe, Sweden). *Rend. Gastroenterol.* 3:174-177, 1971.

0052 DUODENAL PERISTALSIS IN MAN. *(E.)* Torsoli, A.; Corazziari, E.; Waller, S. L.; Anzini, F. (Med. Clin. II, Univ. Rome, Italy). *Rend. Gastroenterol.* 3:168-173, 1971.

0053 HYDRODYNAMIC OF THE COMMON BILE DUCT. OUR EXPERIENCE WITH A NEW EXPLORATIVE METHOD DURING SURGERY. *(E.)* Puente, J. L.; Potel, J. (Sch. Med. Univ. Hosp., Santiago de Compostela, Spain). *Chir. Gastroenterol.* 6(2):129-148, 1972.

0054 EFFECT OF HEPATIC AND CELIAC VAGAL STIMULATION ON COMMON BILE-DUCT PRESSURE. *(E.)* Hopton, D.; White, T. T. (Univ. Wash. Sch. Med., Seattle). *Am. J. Dig. Dis.* 16(12):1095-1101, 1971.

0055 ANALYSIS OF THE PROPULSIVE MOVEMENTS OF THE SMALL INTESTINE; CINERADIOGRAPHIC AND EXPERIMENTAL STUDIES. *(E.)* Lenz, H.; Bloemer, A.; Duex, A. (Dep. Radiol., Univ. Bonn, Germany). *Am. J. Dig. Dis.* 16(12):1107-1115, 1971.

0056 ACTIONS OF CHOLECYSTOKININ/PANCREOZYMIN, SECRETIN AND GASTRIN ON EXTRA-HEPATIC BILIARY TRACT MOTILITY *IN VITRO*. *(E.)* Toouli, J.; Watts, J. McK. (Dep. Surg., Montash Univ., Melbourne, Australia). *Ann. Surg.* 175(3):439-447, 1972.

0057 PACING THE CANINE STOMACH WITH ELECTRIC STIMULATION. *(E.)* Kelly, K. A.; La Force, R. C. (Mayo Clin. Mayo Found., Rochester, Minn.). *Am. J. Physiol.* 222(3):588-594, 1972.

0058 INTERACTION OF GASTRIN I AND SECRETIN ON GASTROINTESTINAL CIRCULAR MUSCLE. *(E.)* Lipshutz, W.; Cohen, S. (Hosp. Univ. Pa., Philadelphia). *Am. J. Physiol.* 222(3):775-782, 1972.

0059 THE MOTILITY OF THE PANCREATIC DUCT OF THE CAT; AN IN-VITRO STUDY. *(E.)* Lenninger, S. (Inst. Physiol., Univ. Lund, Sweden). *Acta Physiol. Scand.* 84(1):134-141, 1972.

0060 THIRD INTERNATIONAL SYMPOSIUM ON GASTROINTESTINAL MOTILITY; STOCKHOLM, SEPTEMBER 1971; SUMMARY COMMENTS ON SESSION ON ELECTROPHYSIOLOGY. *(E.)* Daniel, E. E.; Holman, M. E. (Dep. Pharmacol., Univ. Alberta, Edmonton, Canada). *Am. J. Dig. Dis.* 17(4):287-288, 1972.

0061 THE ULTRASTRUCTURAL BASES FOR COORDINATION OF INTESTINAL MOTILITY. *(E.)* Daniel, E. E.; Duchon, G.; Henderson, R. M. (Dep. Pharmacol., Univ. Alberta, Edmonton, Canada). *Dig. Dis.* 17(4):289-298, 1972.

0062 STIMULATION OF THE ELECTRIC-CONTROL ACTIVITY OF THE STOMACH BY AN ARRAY OF RELAXATION OSCILLATORS. *(E.)* Sarna, S. K.; Daniel, E. E.; Kingma, Y. J. (Dep. Pharmacol., Univ. Alberta, Edmonton, Can.). *Am. J. Dig. Dis.* 17(4):299-310, 1972.

0063 PROPAGATION AND ELECTRICAL ENTRAINMENT OF INTESTINAL SLOW WAVES. *(E.)* Specht, P. C.; Bortoff, A. (Upstate Med. Cent., State Univ. N. Y., Syracuse, N.Y.). *Am. J. Dig. Dis.* 17(4):311-316, 1972.

0064 TEMPORAL RELATIONSHIP BETWEEN ELECTRICAL AND MECHANICAL ACTIVITY OF LONGITUDINAL AND CIRCULAR MUSCLE DURING INTESTINAL PERISTALSIS. *(E.)* Bortoff, A.; Ghalib, E. (Upstate Med. Cent., State Univ. N.Y., Syracuse). *Am. J. Dig. Dis.* 17(4):317-326, 1972.

0065 MODIFICATIONS OF ELECTRICAL ACTIVITY OF THE RABBIT DUODENUM LONGITUDINAL MUSCLE AFTER CONTRACTIONS OF THE CIRCULAR MUSCLE. *(E.)* Gonella, J. (Inst. Neurophysiol. Psychophysiol., CNRS, Marseilles, France). *Am. J. Dig. Dis.* 17(4):327-332, 1972.

0066 VARIATIONS OF THE GASTRIC ELECTRICAL ACTIVITY IN MAN PRODUCED BY ADMINISTRATION OF PENTAGASTRIN AND BY INTRODUCTION OF WATER OR LIQUID NUTRITIVE SUBSTANCE INTO THE STOMACH. *(E.)* Monges, H.; Salducci, J. (Hop. Nord, Marseille, France). *Am. J. Dig. Dis.* 17(4):333-338, 1972.

0067 CIRCUMFERENTIAL PROPAGATION OF THE CANINE GASTRIC PACESETTER POTENTIAL. *(E.)* Kelly, K. A.; La Force, R. C. (Mayo Clin. Mayo Found., Rochester, Minn.). *Am. J. Dig. Dis.* 17(4):339-343, 1972.

0068 ELECTRICAL ACTIVITY IN THE GASTRODUODENAL AREA--SLOW WAVES IN THE PROXIMAL DUODENUM; A COMPARISON OF MAN AND DOG. *(E.)* Duthie, H. L.; Brown, B. H.; Robertson-Dunn, B.; Kwong, N. K.; Whittaker, G. E.; Waterfall, W. (Reg. Med. Phys. Dep., Sheffield, England). *Am. J. Dig. Dis.* 17(4):, 344-351, 1972.

0069 SMALL INTESTINAL CINEMATOGRAPHY CORRELATED TO PRESSURE WAVES, DIFFERENTIAL PRESSURE AND ACTION POTENTIALS. *(E.)* Drewes, V. M. (Skive Hosp., Denmark). *Am. J. Dig. Dis.* 17(4):352-356,1972.

MOTILITY

0070 ELECTROMYOGRAPHY OF THE COLON IN THE UNANESTHETIZED CAT. *(E.)* Wienbeck, M.; Christensen, J.; Weisbrodt, N. W. (Med. Univ., Marburg-Lahn, Germany). *Am. J. Dig. Dis.* 17(4):356-362, 1972.

0071 MODIFICATION OF THE ELECTRICAL ACTIVITY OF THE HUMAN INTESTINE AFTER SEROTONIN AND CAERULEIN. *(E.)* Labo, G.; Barbara, L.; Lanfranchi, G. A.; Bortolotti, M.; Miglioli, M. (Med. Pathol. I, Univ. Bologna, Italy). *Am. J. Dig. Dis.* 17(4):363-372, 1972.

0072 EFFECT OF SODIUM DEOXYCHOLATE ON THE RESPONSE OF THE ISOLATED RAT STOMACH TO VAGAL STIMULATION. *(It.)* Bettini, V.; Fabbrucci, I. (Ist. Fisiol. Umana, Univ. Padova, Italy). *Boll. Soc. Ital. Biol. Sper.* 57(22):782-784, 1971.

0073 APPLICATION OF MINIATURIZED MERCURY COLUMN STRAIN GAUGES TO THE STUDY OF GASTRIC MOTILITY. *(E.)* Kelly, J. M.; Connell, A. M.; Kennedy, T. L.; Clarke, E. W. (Dept. Surg., The Queen's Univ., Belfast, Northern Ireland). *Am. J. Dig. Dis.* 17(5):455-462, 1972.

0074 MEASUREMENT OF FECAL OUTPUT IN RATS. *(E.)* Bass, P.; Kennedy, J. A.; Wiley, J. N. (Sch. Pharmacy, Univ. Wisconsin, Madison, Wisconsin). *Am. J. Dig. Dis.* 17(10):925-933, 1972.

0075 ALTERATION OF THE GASTRIC, DUODENAL, AND BILIARY EXCRETION FUNCTION UPON SYNTHETIC PENTAGASTRIN ADMINISTRATION. *(Rus.)* Klimov, P. K.; Barashkova, G. M.; Braginskiy, V. I.; Kotel'nikova, V. I.; Linar, Ye. Yu.; Pavlova, N. S.; Rozova, Ye. I.; Troitskaya, V. B.; Ustinov, V. N.; Fokina, A. A.; Chipens, G. I. (I. P. Pavlov Inst. Physiol., Leningrad, USSR). *Fiziol. Zh. SSR Sechenov* 58(4):579-591, 1972.

0076 ELECTRIC ACTIVITY AND MOTILITY OF THE STOMACH AFTER VAGOTOMY AND DURING ELECTRIC VAGAL EXCITATION IN THE DOG UNDER NARCOSIS. *(Ger.)* Brand, G.; Albert, H.; Kothe, W.; Walther, J.; Splith, G.; Nowoty, K.; Engel, C. (Karl-Marx-U. Leipzig, Germany). *Z. Ges. Inn. Med.* 27(11):464-466, 1972.

See also 0123, 0267, 0269, 0275, 0333, 0334, 0857

SECRETION AND METABOLISM

0077 GASTROINTESTINAL HORMONES AND INSULIN SECRETION. *(E.)* Rehfeld, J. F. (Bispebjerg Hosp., Copenhagen, Denmark). *Scand. J. Gastroenterol.* 7(4):289-292, 1972.

0078 ESTRIOL METABOLISM IN SHEEP: EXCRETION OF BILARY AND URINARY CONJUGATES. *(E.)* Miyazaki, T., Peric-Golia, L.; Slaunwhite, Jr., W. R.; Sandberg, A. A. (1st Dep. Intern. Med., Univ. Tokyo, Japan). *Endocrinology* 90(2):516-524, 1972.

0079 THE IMPORTANCE OF EXTRACELLULAR CALCIUM FOR ACETYLCHOLINE-EVOKED SALIVARY SECRETION. *(E.)* Martinez, J. R.; Peterson, O. H. (Inst. Med. Physiol. C, Univ. Copenhagen, Denmark). *Experientia* 28(2):167-168, 1972.

0080 INTESTINAL ABSORPTION OF BILIRUBIN IN THE DOG. *(E.)* Royer, M.; Sfarcich, D.; Noir, B.; Katz, S. (Policlin. Alejandro Posadas, Haedo, Argentina). *Acta Gastroenterol. Latinoam.* 3(4):183-196, 1971.

0081 CORRELATION BETWEEN SYNTHESIS OF RIBOSOMAL RNA AND STIMULATION OF DNA SYNTHESIS IN MOUSE SALIVARY GLANDS. *(E.)* Novi, A. M.; Baserga, R. (Temple Univ. Sch. Med., Philadelphia). *Lab. Invest.* 26(5):540-547, 1972.

See also 0015, 0168, 0395, 0509, 0809

Stomach

0082 THE EFFECT OF PROSTAGLANDIN E_1 ON CANINE GASTRIC ACID SECRETION AND GASTRIC MUCOSAL BLOOD FLOW. *(E.)* Wilson, D. E.; Levine, R. A. (State Univ. of New York, Downstate Med. Center, N. Y.). *Am. J. Dig. Dis.* 17(6):527-532, 1972.

Conscious dogs with vagally denervated gastric (Heidenhain) pouches were given prostaglandin E_1 (PGE_1) intravenously at the rate of either 1 or 2 μg/kg/min under conditions of maximal histamine stimulation. Changes in the gastric mucosal circulation were measured by the aminopyrine clearance technique. Prostaglandin E_1 significantly inhibited secretory volume and acid output, and such inhibition appeared to vary proportionally to the concentration of the drug used. The inhibitory effect of prostaglandin E_1 on gastric secretion was also associated with a marked reduction in gastric mucosal blood flow. A biphasic response was noted in the ratio reflecting the relationship between changes in gastric mucosal blood flow and rate of gastric secretion. Initially, there was a reduction in this ratio, suggesting that blood was being shunted from the mucosal circulation. As the inhibition of gastric secretion continued and became maximal, the ratio increased, indicating that the persistent reduction in gastric mucosal blood flow was secondary to an inhibition of gastric secretion. These studies indicate that prostaglandin E_1 is a potent inhibitor of histamine-stimulated gastric acid secretion in the dog and that the sustained inhibitory effects of prostaglandin E_1 are probably due to direct action at the oxyntic cell level.

0083 INFLUENCE OF CHOLINERGIC STIMULATION ON GASTRIC SECRETORY RESPONSE TO HISTAMINE IN EX VIVO ISOLATED CANINE STOMACH. *(E.)* Kowalewski, K.; Scharf, R. (Surg.-Med. Res. Inst., Univ. of Alberta, Edmonton, Canada). *Am. J. Dig. Dis.* 17(7):603-611, 1972.

When included into a perfusion system containing a living "supporting" dog, serving as an oxygenator, a totally isolated canine stomach is able to secrete juice rich in H^+ for several hours. The blood circulating in this system is homologous, and gastric secretion may be heightened by continuous intra-arterial infusion of a secretion stimulant. The ex vivo preparation was used for the study of secretion stimulated by histamine and/or bethanechol chloride. All combinations of histamine plus cholinergic drug used in this study gave higher outputs of HCl and pepsin than could be accounted for by summation of stimulatory effects. HCl and pepsin outputs were higher when the two agents were given together than the maximal output of either HCl or pepsin during stimulation by one agent. Thus potentiation of histamine-stimulated acid and pepsin secretion by the cholinergic drug was evident.

0084 CELL PROLIFERATION IN THE MUCOSA OF HEIDENHAIN POUCHES AFTER FEEDING IN DOGS. *(E.)* Willems, G., Vansteenkiste, Y.; Smets, P. (St-Pieters Hospital, 1000-Brussels, Belgium). *Am. J. Dig. Dis.* 17(8):671-674, 1972.

To determine whether postprandial humoral factors can increase the proliferative parameters in the mucosa of vagally denervated fundic pouches, gastric mucosal specimens were collected from dogs with Heidenhain pouches at 4-hour intervals after a meat meal. No histological signs of exfoliation were observed in the pouches after food ingestion. Enhanced DNA synthesis was observed in the specimens after 12 hr, and accelerated mitotic activity after 20 hr. Since direct contact with food, biopsy sequelae, and direct vagal stimulation of the pouch mucosa were excluded by the experimental design, the mediation of the proliferative response by a humoral factor appeared likely.

0085 THE EFFECT OF pH ON THE BINDING AND ACCEPTOR SITES OF INTRINSIC FACTOR. *(E.)* Mansbach, II, C. M.; Miller, E. C.; Golub, M. M. (Duke Univ. Med. Center, Durham, N.C.). *Am. J. Dig. Dis.* 17(8):697-702, 1972.

After exposure to a wide range of pH values, binding and acceptor site activity of intrinsic factor from depepsinized gastric juice was studied. Binding site activity remained stable when preincubated at pH 1.5 to 9.0 for 2 hours whereas acceptor site activity remained stable when preincubated for 4 hours over a similar pH range. During the first hour at pH 10 a modest reduction in binding activity occurred, and during the third and fourth hours of preincubation at pH 1.5 and 2.5. These results were interpreted as demonstrating the relative stability of the binding and acceptor sites of intrinsic factor over a wide range of pH.

0086 THE SECRETORY, HISTOLOGIC AND HISTOCHEMICAL EFFECTS OF ACUTE AND SUBCHRONIC ADMINISTRATION OF ATROPINE SULFATE ON THE GASTRIC MUCOSA OF THE RAT. *(E.)* Lehy, T.; Dubrasquet, M. (Hopital Bichat, Paris, France). *Am. J. Dig. Dis.* 17(10):887-901, 1972.

Morphological and histochemical characteristics of gastric tissue and gastric acid secretion, with and without atropine sulfate, were studied in rats with the acute fistula preparation. In all cases, acid secretion decreased after atropine injection; the inhibition varied from achlorhydria to moderate inhibition. During subchronic treatment the number of achlorhydric rats increased in direct relationship to the length of treatment. Dramatic morphologic changes in the parietal cells, in the form of extremely large vacuoles (up to 20 μ) either empty or filled with cellular debris, were observed during secretory inhibition. These changes were not accompanied by any significant decrease in succinodehydrogenase and adenosine triphosphatase activities. A smaller number of similar vacuoles was found in vagotomized rats, and cystic dilations have also been found in human atrophic gastritis.

0087 EFFECT OF ACETIC ACID ON ANTRAL PHASE OF GASTRIC SECRETION AFTER PROLONGED SYSTEMIC ADMINISTRATION OF PREDNISOLONE.

(E.) Aubrey, D. A.; Burns, G. P. (Llandough Hosp., Cardiff, Wales, Great Britain). *Am. J. Surg.* 124(3):325-330, 1972.

In dogs with vagally denervated fundic pouches, the effect of prolonged intramuscular administration of prednisolone on the antral phase of gastric secretion has been defined. Changes in the secretory response to endogenous gastrin provoked by acetic acid instillation were compared before and after prolonged administration of the steroid. After a six-week course of intramuscular prednisolone, a standard meat meal evoked higher outputs of H^+, but the outputs of Na^+ were unchanged. The antral phase of gastric secretion was enhanced by a selective effect of prednisolone on parietal secretion. Before prednisolone was given, acetic acid exposure caused increased exsorption of Na^+ without hemorrhage from the gastric mucosa. Greater exsorption of Na^+ and bleeding from the mucosa were observed after steroid dosing; nevertheless, the H^+ outputs were larger than those in the original control tests. Thus although acetic acid provoked greater mucosal damage after administration of prednisolone, the damaged mucosa was still able to secrete increased amounts of H^+ in response to stimulation by endogenous gastrin augmented by prednisolone.

0088 EFFECT OF HUMORAL AND CHOLINERGIC STIMULANTS ON SECRETORY FUNCTION OF TOTALLY ISOLATED CANINE STOMACH PERFUSED BY AUTOLOGOUS AND HOMOLOGOUS BLOOD.

(E.) Kowalewski, K.; Ŝcharf, R. (Surg.-Med. Res. Inst., Univ. Alberta, Edmonton, Canada). *Can. J. Surg.* 15(3):153-163, 1972.

The secretory functions of *ex vivo* canine stomachs perfused with blood circulating through a bubble oxygenator and with blood circulated through a circuit containing a supporting dog were compared. Various stimuli known to induce secretion of hydrochloric acid by the parietal cells of the *in vivo* stomach were employed. All stomachs perfused in the supporting-dog system secreted physiologic acid-containing gastric juice under stimulaton with histamine, histalog, pentagastrin, urecholine, or electricity. All stomachs perfused with mechanically oxygenated blood secreted purely alkaline gastric juice under the same stimulation. The ionic composition of the akaline juice was similar to that of perfusion blood plasma. If the stomachs secreting alkaline juice were rapidly connected to the system containing the supporting dog, they began to secrete hydrogen ion; thus the inability to secrete acidic juice was not permanent. The gastric juice also contained HCl when the canine liver plus stomach were perfused through the bubble oxygenator. The results suggest that a factor as yet unknown and present in the supporting dog or in the liver conditions the parietal cell to respond to humoral and cholinergic agents. The supporting dog or the liver may also play the role of a dialyzer in the perfusion system.

0089 EFFECT OF TRUNCAL VAGOTOMY ON GASTRIN RELEASE AND HEIDENHAIN POUCH ACID SECRETION IN RESPONSE TO FEEDING IN DOGS.

(E.) Walsh, J.H.; Csendes, A.; Grossman, M.I. (Wadsworth General Hosp., Los Angeles, Calif.). *Gastroenterology* 63(4):593-600, 1972.

Before and after truncal vagotomy in 4 dogs with gastric fistulae and Heidenhan pouches, serum gastrin responses and Heidenhain pouch acid outputs were measured in response to feeding beef liver, 15 g per kg. Completeness of vagotomy was confirmed by the failure to elicit acid responses from the gastric fistulae after giving 0.5 U of insulin per kg intravenously. Truncal vagotomy changed meal-induced rises in serum gastrin and Heidenhain pouch acid secretion in opposite directions; the rise in serum gastrin decreased by about 50% but Heidenhain pouch acid secretion increased by about 50%. After vagotomy, maximum acid secretion from the Heidenhain pouch in response to pentagastrin increased 2-fold while the response to histamine remained unchanged. The dose of pentagastrin required to elicit a half-maximal response did not change significantly. These studies indicate that the increased Heidenhain pouch acid response to a meal after truncal vagotomy is due to increased tissue sensitivity rather than to increased antral gastrin release. It appears that the pouch is more sensitive to gastrin and perhaps to other stimulants possibly because of the removal of a vagally mediated noncompetitive inhibitor of gastrin.

0090 CIRCADIAN RHYTHM IN PLASMA LEVEL OF GASTRIN.

(E.) Ganguli, P.C.; Forrester, J.M. (Clin. Endocrinol. Unit, Edinburgh, Scotland). *Nature New Biol.* 236:127-128, 1972.

Plasma gastrin levels in six males aged 21-47 yr were examined by radioimmunoassay for the presence of circadian rhythm. The observed gastrin levels were generally low. No obvious rhythm was apparent, but pooled levels showed a peak at 2400 hr and a trough at 0400 hr. The evening rise was in general accord with reports on human gastric acid secretion; however, the amplititude of the circadian change was at the most only 10% above or below the mean level, which was much less than the amplitude of reported changes in acid secretion. This is attributed to the fact that gastric content was not continuously withdrawn. Apparently, the physiological inhibition of gastrin release by the presence of acid in the antrum of the stomach was preserved.

0091 METHOXYFLURANE (PENTHRANE) ANESTHESIA EFFECT ON HISTAMINE STIMULATED GASTRIC SECRETION IN THE CHICKEN.

(E.) Kessler, C. A., Hirschowitz, B. I.; P. G. Burhol; Sachs, G. (Dep. Med., Univ. Alabama, Birmingham). *Proc. Soc. Exp. Biol. Med.* 139(4):1340-1343, 1972.

In four White Leghorn hens with chronically implanted gastric cannulas, a step-dose-response study was done with histamine (75-1500 μg base/kg hr) given by subcutaneous infusion. The dose-response study was repeated under Penthrane anesthesia. The theoretical maximum rate of excretion for gastric juice volume calculated from linear transformation of the data was reduced from 10.7 ml/kg hr to 5.6 ml/kg hr. However, the dose of histamine necessary to stimulate secretion of 50% of the maximum rate was only slightly increased.

0092 GASTRIC SECRETION IN IMMUNOSYMPATHECTOMIZED RATS WITH CHRONIC GASTRIC FISTULAS. *(E.)* Thompson, J.H.; Aures, D. (Dept. Pharmacol., U. California, Los Angeles). *Proc. West. Pharmacol. Soc.* 15:216-221, 1972.

Newborn rats were immunosympathectomized by 7 daily injections of bovine nerve growth factor antiserum (100 μliters s.c. with 17,000 antiunits/ml), starting within 8 hr after birth. Controls were rats given 7 daily injections of bovine serum (100 μliters s.c.). Basal gastric juice volume and acid and pepsin outputs were significantly higher in immunosympathectomized rats than in controls, but acid and pepsin concentrations remained unchanged. Immunosympathectomized rats had a greater maximal response to pentagastrin (400 μg/kg) than controls for volume, acid output, and pepsin output. After injection of histamine (10 mg/kg), acid output was higher in immunosympathectomized rats than in controls. Simultaneous administration of histamine (10 mg/kg/hr) and pentagastrin (200 μg/kg/hr) did not produce a greater secretory response than that produced by either agent alone. Atropine sulfate (5μg/ml/kg/hr) significantly depressed gastric secretion to the same extent in both groups of rats. Reserpine (5 mg/kg), administered 2 hr before collection of gastric juice, did not change gastric juice volume and acid output in immunosympathectomized rats but did increase them in controls; pepsin concentration and output were equally depressed in both groups. Thus, immunosympathectomy significantly increases basal gastric secretion but has no appreciable effect on the response to pentagastrin, histamine, or atropine. Reserpine increases gastric juice volume and acid output only in intact animals. These changes in gastric secretion cannot be accounted for by changes in catecholamine distribution, but may be caused by changes in tissue serotonin.

0093 ADULT HUMAN LIVER GROWTH IN TISSUE CULTURE. *(Rus.)* Blyuger, A. F.; Veksler, Kh. M.; Timoshenko, Zh. P.; Treya, I. A.; Golubov, I. S. (Riga Med. Inst., Riga, USSR.). *Biull. Eksp. Biol. Med.* 73(4):92-95, 1972.

0094 BILE EXCRETION AND ITS BIOCHEMICAL PROPERTIES IN FUNCTIONAL DISORDERS OF THE THYROID GLAND. *(Pol.)* Swierczek, J. (Inst. Gen. & Exper. Path. Cracow, Poland). *Folia Med. Cracov.* 14(3):465-489, 1972.

0095 ULTRASTRUCTURAL ALTERATIONS OF THE MOUSE LIVER AFTER THE OVERDOSE ADMINISTRATION OF VITAMIN D. *(Jap.)* Saeki, S. (Nagoya City Univ. Med. Sch., Japan). *J. Nagoya City Univ. Med. Ass.* 22(4):407-421, 1972.

0096 EXPERIMENTAL STUDIES ON THE EFFECT OF COBAMAMIDE ON LIVER REGENERATION. *(It.)* Della Volpe, R.; Marmori, M.; Albertini, E. (Ist. Patol, Gen., Univ. Parma, Italy). *Riv. Anat. Pat. Oncol,* 36(9/12):479-485, 1970.

0097 CHLORINATED TRIPHENYL-INDUCED EXTENSIONS OF THE HEPATIC ENDOPLASMIC RETICULUM. *(E.)* Norback, D. H.; Allen, J. R. (Univ. Wisconsin Med. Sch., Madison). *Proc. Soc. Exp. Biol. Med.* 139(4): 1127-1131, 1972.

0098 INHIBITION OF MOUSE LIVER PROTEIN AND NUCLEAR RNA SYNTHESIS FOLLOWING COMBINED ORAL TREATMENT WITH SODIUM NITRITE AND DIMETHYLAMINE OR METHYLBENZYLAMINE. *(E.)* Friedman, M. A.; Millar, G.; Sengupta, M.; Epstein, S. (Child. Cancer Res. Found., Boston, Mass.). *Experientia* 28(1):21-23, 1972.

0099 MODIFICATIONS INDUCED BY CARBON TETRACHLORIDE IN THE LEVELS OF ATP, LACTIC ACID, AND PYRUVIC ACID IN THE BLOOD AND LIVER OF RATS. EFFECT OF TREATMENT WITH SILIMARIN. *(Sp.)* Alemany Ontiveros, J. R.; Monfort Albelda, R.; Sanchez de la Cuesta y de Alarcon, F.; Aznar Lopez, J. (Inst. Med. Exp. C. H. Boehringer Sohn Ingelheim, Spain). *Med. Espan.* 67:107-114, 1972.

0100 EXPERIMENTAL CIRRHOSIS OF THE LIVER, INDUCED BY DYSENTERY TOXIN. *(Rus.)* Khanin, M. N.; Alimova, L. A.; Irgashev, M. K. (Tashkent Med. Inst., Tashkent, USSR.). *Biull. Eksp. Biol. Med.* 73(4):21-24, 1972.

0101 EFFECT OF ACETAZOLAMIDE ON THE OUTPUT AND IONIC COMPOSITION OF GASTRIC JUICE DURING MAXIMAL ACID STIMULATION. *(Ger.)* Mertz, D. P.; Poppe, W.; Thongbhoubesra, T. (Med. Poliklin. Univ. Freiburg, Germany). *Schweiz. Med. Wochenschr.* 102(25): 881-886, 1972.

0102 CRITICAL ANALYSIS OF THE PERFORMANCE AND EVALUATION OF BASAL AND STIMULATED GASTRIC SECRETION TESTS. *(Ger.)* Feifel, G.; Lorenz, W.; Heimann, A.; Woerschnig, I. (Clhr. Klin, Univ. Muenchen, Germany). *Klin. Wochenschr.* 50(8):413-422, 1972.

0103 STUDIES INTO HUMAN IF [INTRINSIC FACTOR] SECRETION. *(E.)* Twomey, J. J.; Laughter, A. H.; Jordan, P. H., Jr. (VA Hosp. and Baylor Col. Med., Houston, Tex.). *Am. J. Dig. Dis.* 16(12):1075-1081, 1971.

0104 INHIBITORY EFFECT OF β-ADRENERGIC BLOCKING AGENT PROPRANOLOL ON HISTAMINE STIMULATED GASTRIC ACID SECRETION IN MAN. *(E.)* Geumie, A.; Isaa, I.; EL-Gendi, M.; Abd-EL-Samie, Y. (Dept. Pharmacol., Faculty of Med., Alexandria Univ., U.A.R.). *Am. J. Dig. Dis.* 17(1):55-58, 1972.

0105 EFFECT OF SATIETY CENTER DAMAGE ON FOOD INTAKE, BLOOD GLUCOSE AND GASTRIC SECRETION IN DOGS. *(E.)* Nagamachi, Y. (Dept. Surg. I, Gunma Univ. Sch. Med., Maebashi, Japan). *Am. J. Dig. Dis.* 17(2):139-148, 1972.

0106 INHIBITION OF GASTRIC SECRETION BY MEDIUM CHAIN TRIGLYCERIDES IN BILE DIVERTED RATS. *(E.)* Sutton, P.; Long, J. F. (Dept. Physiol., Albany Med. Col., Albany, N. Y.). *Am. J. Dig. Dis.* 17(2):149-152, 1972.

0107 EFFECTS OF CHRONIC ADMINISTRATION OF ETHANOL ON GASTRIC SECRETION OF ACID IN DOGS. *(E.)* Chey, W. Y.; Kosay, S.; Lorbor, S. H. (Dept. Med., Temple Univ. Health Sci. Center, Philadelphia, Pa.). *Am. J. Dig. Dis.* 17(2):153-159, 1972.

0108 CHRONIC EFFECTS OF NICOTINE ON GASTRIC SECRETION IN RATS WITH HYPOTHALAMIC LESIONS. *(E.)* Thompson, J. H.; George, R. (Dept. Pharmacol. Exp. Ther., Univ. California at Los Angeles 90024). *Am. J. Dig. Dis.* 17(6):513-518, 1972.

0109 THE EFFECT OF ANTIDIURETIC HORMONE ON GASTRIC SECRETION IN MAN. *(E.)* Schapiro, H.; Britt, L. G.; Lewis, M.; Gompertz, M. L. (Dept. Anat., Univ. Tennessee Med. Units, and Memphis VA Hosp., Memphis). *Am. J. Dig. Dis.* 17(6):519-522, 1972.

0110 COMPARATIVE RELATIONSHIP BETWEEN SERUM GASTRIN CONCENTRATION AND GASTRIC ACID OUTPUT. *(E.)* Lanciault, G.; Merritt, A.; Rosato, E.; Bonoma, C.; Brooks, F. P. (Dept. Physiol. Med., Univ. Pennsylvania, Sch. Med. and Vet. Med. and VA Hosp. Philadelphia). *Am. J. Dig. Dis.* 17(6):523-526, 1972.

0111 CAERULEIN ACTION ON GASTRIC SECRETION IN NORMAL AND HYPOXIC RATS. *(E.)* Cannata, B.; Alonso, A.; Zeolite, C.; Figueroa, E.; Suarez, J. R. E. (Fac. Med., U. N. C., Mendoza, Argentina). *Acta Gastroenterol. Latinoam.* 4(1):21-24, 1972.

0112 ACTION OF CHOLECYSTOKININ ON PENTAGASTRIN STIMULATED GASTRIC ACID SECRETION IN MAN. *(Sp.)* Tomatis, H. P. (Hosp. San Roque, Cordoba, Argentina). *Acta Gastroenterol. Latinoam.* 3(4):167-178, 1971.

0113 HISTAMINE AND THE PARIETAL CELL. *(E.)* Waton, N. G. (Dep. Pharmacol., Univ. Strathclyde, Glasgow, Scotland). *Am. J. Dig. Dis.* 16(10):921-938, 1971.

0114 SOME ASPECTS OF THE PROBLEM OF GASTRIC HYDROCHLORIC ACID SECRETION. *(E.)* Rehm, W. S. (Med. Cent., Univ. Alabama, Birmingham). *Arch. Intern. Med.* 129(2):270-278, 1972.

0115 STUDY ON THE ACTION OF PROXAZOLE CITRATE ON GASTRIC BLOOD SUPPLY. ENDOSCOPIC FINDINGS IN ELDERLY PATIENTS. *(E.)* Calabrese, L.; Macchini, M. (Arcisped. Santa Maria Nuova, Florence, Italy). *Arzneim. Forsch.* 22(4):763-768, 1972.

0116 STUDY OF THE CONCENTRATION OF MUCOPROTEIN IN THE GASTRIC JUICE FROM HEALTHY SUBJECTS AND GASTRODUODENAL PATIENTS BEFORE AND AFTER TREATMENT WITH A GASTRO-PROTECTIVE DRUG, ZOLIMIDINE. *(E.)* Camarri, E.; Zaccherotti, L.; D'Alonzo, D. (Osp. Misericordia, Grosseto, Italy). *Arzneim. Forsch.* 22(4):768-772, 1972.

0117 EFFECT OF CIGARETTE SMOKING ON GASTRIC SECRETION. *(E.)* Wilkinson, A. R.; Johnston, D. (Gen. Infirmary, Leeds, England). *Lancet* (7745):320, 1972.

0118 STIMULATION OF GASTRIN RELEASE BY CATECHOLAMINES. *(E.)* Hayes, J. R.; Ardill, J.; Kennedy, T. L.; Shanks, R. G.; Buchanan, K. D. (Dep. Med., Queen's Univ. Belfast, North. Ireland). *Lancet* (7755):819-821, 1972.

0119 GASTRIC MUCOSAL BARRIER AND ACID SECRETION IN MAN. *(Pol.)* Stolia, T.; Konturek, S. (Inst. Fizjol., Krakow, Poland). *Pol. Tyg. Lek.* 26(43):1651-1654, 1971.

0120 FASTING ACID OUTPUT AND PLASMA GASTRIN IN CONSCIOUS MONKEYS. *(E.)* Rosato, E. F.; Mullen, J. L.; Lanciault, G.; Rosato, F. E.; Brooks, F. P. (Univ. Pennsylvania Sch. Med., Philadelphia). *Proc. Soc. Exp. Biol. Med.* 139(3):833-835, 1972.

0121 CHEMICAL COMPOSITION OF THE GASTRIC JUICE. *(Sp.)* Meeroff, J. C. (Sanatorio Metropolitano, Madrid, Spain). *Rev. Esp. Enferm. Apar. Dig.* 36(4):451-486, 1972.

0122 ACTION OF PREDNISONE, PREDNISOLONE, TRIAMCINOLONE, AND DEXAMETHASONE ON GASTRIC SECRETION IN HEALTHY SUBJECTS. *(Sp.)* Pena Yanez, A.; Juarez Fernandez, C.; Rico Irles, J.; Pena Angulo, J. E. (II Clin. Med., Univ. Granada, Spain). *Rev. Esp. Enferm. Apar. Dig.* 37(3):301-316, 1972.

0123 EFFECT OF THE LEVEL OF SMALL BOWEL REVERSAL ON GASTRIC HYPERSECRETION. *(E.)* Lulu, D. J.; Dragstedt, L. R. (V.A. Hosp., Des Moines, Iowa). *Am. J. Surg.* 124(3):322-324, 1972.

0124 CELL DIVISION AND DNA SYNTHESIS ALTERATIONS OCCURRING IN THE GASTRIC FUNDUS (FUNDUS VENTRICULI) GLANDS OF THE RAT UPON EXPOSURE TO RADIUM EMANATION. *(Rus.)* Zaporozhenko, I. G. (Inst. Med. Genetics USSR Acad. Med. Sci., Moscow, U.S.S.R.). *Biull. Esp. Biol. Med.* 73(4):95-98, 1972.

0125 THE EFFECT OF TOBACCO SMOKING ON THE GASTRIC AND PANCREATIC SECRETORY FUNCTION IN MAN. *(Pol.)* Konturek, S.; Biernat, J.; Radecki, T. (Inst. Physiol. Acad. Med. Krakow, Poland). *Pol. Arch. Med. Wewnet.* 48(4):383-388, 1972.

0126 EFFECT OF HEPARIN ON GASTRIC AND DUODENAL SECRETION. *(Ger.)* Koch, H.; Stolle, A.; Domschke, W.; Classen, M. (Med. Klin. Poliklin., Univ. Erlangen-Nuernberg, Germany). *Z. Gastroenterol.* 10(3):163-168, 1972.

0127 MURAMIDASE ACTIVITY IN SALIVA, GASTRIC JUICE AND SERUM IN PATIENTS AFTER GASTRECTOMY FOR GASTRIC OR DUODENAL ULCER. *(Pol.)* Kowal-Gierczak, B.; Hanczycowa, H.; Lubczynska-Kowalska, W. (Acad. Med., Wroclaw, Poland). *Pol. Tyg. Lek.* 27(28): 1071-1073, 1972.

See also 0001, 0010, 0050, 0075, 0076, 0190, 0220,
0268, 0269, 0311, 0320, 0327, 0338, 0341,
0351, 0361, 0374, 0397, 0400, 0417

SECRETION AND METABOLISM

Pancreas

0128 EFFECTS OF TETRACYCLINE ON PANCREATIC PROTEIN SYNTHESIS AND SECRETION IN PIGEONS. *(E.)* Tucker, P. C.; Webster, P. D. (Vet. Admin. Hosp., Augusta, Ga. 30904). *Am. J. Dig. Dis.* 17(8):675-682, 1972.

The effects of tetracycline hydrochloride on pancreatic protein synthesis and secretion in pigeons were examined, in vivo and in vitro. Impaired transport of secretion of amylase by the pancreas of treated animals was an unexpected finding. The studies indicate that tetracycline hydrochloride interferes with processes of enzyme secretion as well as protein synthesis and suggest that gastrointestinal dysfunction observed in patients receiving the antibiotic may, in part, be due to defective pancreatic protein synthesis and secretion.

0129 INHIBITORY ACTION OF ALCOHOL OF HUMAN EXOCRINE PANCREATIC SECRETION. *(E.)* Mott, C.; Sarles, H.; Tiscornia, O.; Gullo, L. (Inst. Nat. San. Rech. Med., 13009 Marseille, France). *Am. J. Dig. Dis.* 17(10):902-910, 1972.

The effects of ethanol, administered intravenously or intragastrically, on exocrine pancreatic secretion were investigated in 15 healthy human subjects under conditions which prohibited gastric secretions from reaching the duodenum. By either administration route, ethanol substantially reduced volume, concentration and output of bicarbonates, lipase and chymotrypsim. This action was interpreted as direct inhition of the pancras by ethanol, partly because the time of maximum inhibition coincided with the peak blood alcohol levels. However, calcium concentration in duodenal juice increased with intragastric ethanol administration and decreased with intravenous ethanol administration.

0130 PANCREAS ACINAR CELL REGENERATION. XII. PROTEIN METABOLISM AS DETERMINED BY ^{3}H-LEUCINE AUTORADIOGRAPHY. *(E.)* Vinijchaikul, K.; Fitzgerald, P. J. (Downstate Med. Center, State Univ. of New York, Brooklyn, 11203). *Am. J. Pathol.* 66(3):407-434, 1972.

Protein metabolism in the regenerating rat pancreas acinar cell was studied by ^{3}H-leucine autoradiography. Placing rats for 10 days on a protein-free ethionine regimen caused necrosis of most of the acinar cells. Return to a stock diet on day 11 was followed by good restitution of acinar cell morphology. DNA synthesis peaked at day 15. At days 10, 12 and 15, after return to stock diet, there were great increases in the concentration of autoradiographic grains over the nucleolus, nucleus and cytoplasm of acinar cells as compared to similar compartments in controls. The grains per unit area of nucleus and cytoplasm of regenerating acinar cells at days 10, 12 and 15 increased to about the same degree, but the increase in concentration of grains per unit area of nucleolus was much higher than in the two other compartments. The increase in total number of grains in the nucleolus was much higher than that per nucleus in test animals on days 12 and 15.

Some of the disproportionately high concentration and amount of newly synthesized labeled protein in the nucleolus on days 12 and 15 after return to stock diet may have been involved in genomic activity.

0131 A RAPID THIN LAYER TEST FOR MACROAMYLASE WITH OBSERVATIONS ON THE NATURE OF MACROAMYLASE IN SIX PATIENTS. *(E.)* Long, W.B., Kowlessar, O.D. (Philadelphia General Hosp., Pa.). *Gastroenterology* 63(4):564-571, 1972.

A rapid method for detection of macroamylase by thin layer Sephadex G-100 filtration is described. Twelve serum samples of 5 μliters each are assayed in 3 hr on a single thin layer plate. Amylase is detected by reaction with amylopectin coupled with Reactone Red B (Dy-Amyl). Three (5.9%) of 51 consecutive patients with elevated serum amylase screened by this technique were found to have macroamylasemia, and in three additional patients, macroamylase was first identified by column chromatography. The thin layer technique detected 20 Somogyi units per 100 ml of normal molecular weight amylase, and 35 to 63 Somogyi units per 100 ml of macroamylase. The discrepancy of sensitivity for normal amylase and macroamylase is attributed to dissociation of macroamylase into normal molecular weight amylase during filtration. Dissociation during chromatography at pH 7.2, which is not characteristic of antigen-antibody complexes, was documented. The degree of dissociation, which varied with different macroamylases, was consistently reduced by increasing the amount of serum chromatographed.

0132 INHIBITORY EFFECT OF ETHANOL ON CANINE EXOCRINE PANCREATIC SECRETION. *(E.)* Bayer, M.; Rudick, J.; Lieber, C.S.; Janowitz, H.D. (Dept. Surg. of the Mt. Sinai Sch. Med. of the City Univ. New York, N.Y.) *Gastroenterology* 63(4):619-626, 1972.

Using an experimental setup in which the effects of pancreatic duct obstruction were eliminated by direct cannulation, the effects of intravenous ethanol on steady state secretin and pancreozymin-stimulated pancreatic secretion were studied in 25 experiments in 7 dogs. Free flow of pancreatic juice was obtained by direct cannulation of the main pancreatic duct (the minor duct being ligated): a gastric fistula prevented the entry of gastric acid into the duodenum. Ethanol was given in doses achieving varying blood levels: 25.2, 44, 55.2, and 91.5 mg per 100 ml, comparable to those obtained in man by moderate oral intake. After administration of intravenous ethanol, prompt and marked inhibition of secretory volume occurred. The medium effective dose for peak inhibition of volume was 560 mg per kg. A concomitant reduction in concentration and output of bicarbonation and a rise in chloride ion concentration were observed. No significant alterations in enzyme (protein) concentration of the juice occurred, but output was decreased. Blood glucose was unaltered. The effects of ethanol on external pancreatic secretion were related to the dose and the blood alcohol level achieved. The reduction in volume appears to be due to direct effects on pancreatic secretion rather than damage to the ductal system.

0133 THE EFFECT OF PROTEIN DEPRIVATION ON PANCREATIC FUNCTION IN YOUNG ANIMALS AND ON ANIMALS IN UTERO. *(E.)* Klotz, A. P.; Murdock, A. L.; Svoboda, D. J. (Univ. Kansas Med. Cent., Kansas City, Kans.). *Am. J. Dig. Dis.* 17(5):399-406, 1972.

0134 AUGMENTATION OF SECRETIN INDUCED PANCREATIC SECRETION BY CAERULEIN. *(E.)* Konturek, S. J.; Biernat, J.; Grzelec, T. (Inst. Physiol., Med. Acad., Cracow, Poland). *Am. J. Dig. Dis.* 17(7):643-647, 1972.

0135 EFFECT OF ATROPINE ON PANCREATIC RESPONSES TO ENDOGENOUS AND EXOGENOUS CHOLECYSTOKININ. *(E.)* Konturek, S. J.; Tasler, J.; Obtulowicz, W. (Inst. Physiol., Med. Acad., Cracow, Poland). *Am. J. Dig. Dis.* 17(10):911-917, 1972.

0136 VARIATION OF PANCREATIC JUICE SECRETION UPON STIMULATION OF THE GALLBLADDER IN DOGS. *(Rus.)* Anoshina, A. A. (Inst. Exper. Med., Leningrad, USSR). *Biull. Eksp. Biol. Med.* 73(4):13-15, 1972.

0137 ACTION OF PIG GASTRIN AND GASTRIN PENTAPEPTIDE ON BILIARY AND PANCREATIC SECRETIONS IN THE ANESTHETIZED RAT. *(Fr.)* Debray, C.; Vaille, C.; Vasseur, B.; de la Tour, J.; Roze, C.; Souchard, M. (Hop. Bichat, Paris, France). *Sem. Hop. Paris* 47(31-34):2015-2022, 1971.

See also 0020, 0125, 0234, 0260

0138 THE EFFECT OF SLIGHT HYPOTHERMIA ON LIVER FUNCTION AS MEASURED BY THE ELIMINATION RATE OF ETHANOL, THE HEPATIC UPTAKE AND EXCRETION OF INDOCYANINE GREEN AND BILE FORMATION. *(E.)* Krarup, N.; Larsen, J. A. (Inst. Of Physiol., Univ. of Aarhus, Denmark). *Acta Physiol. Scand.* 84(2):396-407, 1972.

Liver function changes during hypothermia were followed by determination of the ethanol elimination rate, bile flow, the hepatic uptake and excretion of Indocyanine Green and the excretion of bile acids and electrolytes. A fall in the body temperature 1-2°C from normal, was accompanied by a sudden decrease of about 25 per cent in the elimination rate of ethanol, bile flow and the hepatic uptake and excretion of Indocyanine Green. The effects of cooling on bile flow and the ethanol elimination rate were significantly correlated. The cooling caused only minor effects on the excretion of bile acids and the biliary electrolyte composition. The findings may be explained by intrahepatic vascular changes resulting in a decrease in the number of perfused sinusoids and a corresponding reduction in the functional capacity. The response to cooling seems to represent an "all-or-none" situation, thus providing confirmatory evidence of intermittancy of liver blood flow and indicating the regulatory significance of slight temperature changes.

0139 BILE COMPOSITION IN THE PREGNANT RABBIT. *(E.)* Johnson, J.; Kalant, N. (Lady Davis Inst., Jewish Gen. Hosp., Montreal, PQ, Canada). *Am. J. Dig. Dis.* 17(1):1-6, 1972.

The effects of pregnancy on the bile acid composition of rabbits was determined by collecting bile from the hepatic duct and gallbladder of normal and 3-week pregnant rabbits. Bile acids were separated by thin-layer chromatography and measured by an enzymatic procedure. The relative and absolute concentrations of the bile acids in hepatic bile were the same for the 2 groups of animals. Glycodeoxycholic was the major bile acid, while glycochenodeoxycholic was the second most abundant. The relative concentration of glycine conjugates was higher in the gallbladder than in hepatic bile, while concentrations of lithocholate, unconjugated dihydroxy acids and two minor unidentified acids were lower; these differences between hepatic and gallbladder bile are most readily explained by reabsorption of unconjugated mono- and dihydroxy acids through the gallbladder wall. The differences were more marked in pregnant animals; this may be due to biliary stasis and increased time for reabsorption.

0140 ENDOTOXIN-INDUCED HEPATIC DAMAGE IN BCG-INFECTED MICE. *(E.)* Shands, J.W., Jr.; Senterfitt, V.C. (U. Florida, Sch. Med., Gainesville). *Am. J. Pathol.* 67(1):23-39, 1972.

Mice made hyperreactive to endotoxin by infection with *Mycobacterium bovis* BCG exhibited acute hepatic injury when given small doses of endotoxin. Large increases in serum glutamic oxaloacetic and serum glutamic pyruvic transaminase, acid phosphatase, and glucuronidase occurred after a dose of endotoxin that produced only minor changes in enzyme levels in normal mice. Morphologic alterations, determined by light and electron microscopy, caused by 1.0 mg endotoxin included glycogen depletion, mitochondrial swelling, disruption of the continuity of sinusoidal endothelium and focal injury characterized by marked vacuolization of hepatocytes and distention and fragmentation of rough endoplasmic reticulum. Histochemical studies showed the apparent release of acid phosphatase from granules in the central portion of granulomas and the release of β-glucuronidase from the cytoplasm of hepatocytes. These observations suggest both lysosomal labilization in granulomas with enzyme release and hepatocyte damage with enzyme release.

0141 MECHANISM OF CHOLESTASIS. 5. BILE ACIDS IN NORMAL RAT LIVERS AND IN THOSE AFTER BILE DUCT LIGATION. *(E.)* Greim, H., Trulzsch, D.; Roboz, J.; Dressler, K.; Czygan, P.; Hutterer, F.; Schaffner, F.; Popper, H. (Mount Sinai Sch. of Med., City Univ., New York, N.Y.). *Gastroenterology* 63(5):837-845, 1972.

Using a method modified to detect ursodeoxycholic acid and β-muricholic acid the concentrations and qualitative distribution of bile acids in rat livers were determined before, and 3 and 10 days after, bile duct ligation. After bile duct ligation the secondary bile acids, deoxycholic and hyodeoxycholic acid disappeared, and the concentration of trihydroxylated bile acids was 4 to 5 times normal. Before ligation, cholic acid was the major bile acid; after ligation, β-muricholic acid became the major one by increasing 30-fold. The concentrations of dihydroxylated bile acids almost doubled. Ursodeoxycholic acid normally present only in trace amounts represented one-fourth of the dihydroxylated bile acids after bile duct ligation. The total concentration of the dihydroxylated bile acids approached the level at which competitive inhibition of the cytochrome P-450-dependent microsomal biotransformation system was observed in vitro. This explains the demonstrated disturbance in drug metabolism in obstructive jaundice in rats. A concentration of dihydroxylated bile acids causing detergent action was not reached, which is why feathery degeneration is hardly ever seen in the rat. The lack of detergent action can be explained by a protective mechanism in the rat, comprising accentuation of normally little used alternate pathways, providing relatively inert ursodeoxycholic acid and β-muricholic acid.

0142 CORRELATION BETWEEN BILE SECRETION AND TRIGLYCERIDE RELEASE IN PERFUSED RAT LIVER AND SOME EFFECTS OF FENFLURAMINE. *(E.)* Marsh, J. B.; Guaitani, A.; Bartosek, I.; Bizzi, A. (Ist. Mario Negri, Milan, Italy). *Proc. Soc. Exp. Biol. Med.* 139(3):753-761, 1972.

Livers from rats injected intraperitonally with 20 mg/kg of *dl*-fenfluramine were perfused to determine the effects of the drug on liver triglyceride secretion. A significant correlation between bile flow and triglyceride output was obtained in both fenfluramine-treated animals and controls. The direct addition of 10^{-4} M fenfluramine to the perfusion medium depressed triglyceride release and rate of bile flow. Further experiments are needed to determine whether a dose-response relationship exists.

0143 GLUCOSE-6-PHOSPHATE DEHYDROGENASE IN THE DEVELOPING HUMAN LIVER. *(E.)* Messina, A.M.; Chacko, C.M.; Nadler, H.L. (Northwestern Univ. Sch. of Med. and Children's Memorial Hosp., Chicago, Ill.). *Proc. Soc. Exp. Biol. Med.* 139(3):778-782, 1972.

Glucose-6-phosphate dehydrogenase (G-6-PD) was studied in fetal, newborn, and adult human liver. Distinct differences were observed in specific activity, pH optimum, and thermal stability of the fetal enzyme compared with newborn and adult enzyme. No differences were observed in Michaelis-Menten constants or electrophoretic mobility. The most significant change in G-6-PD activity occurred at 18-24 wk gestation, when specific activity increased sharply between pH 9.5 and 10.0. At this time, activity was twice as high as newborn and adult levels. Fetal liver preparations incubated at 45 deg for 15 min retained about 40% of initial G-6-PD activity. In contrast, newborn and adult liver preparations retained more than 75% of the initial activity. These differences suggest that fetal G-6-PD is different from that of newborn or adult liver.

0144 SYNTHESIS OF PHOSPHOLIPIDS AND TRIGLYCERIDES IN HUMAN LIVER SLICES. III. INFLUENCE ON BILE ACIDS, CHOLINE, AND LINOLEIC ACID. *(E.)* Cahlin, E.; Joensson, J.; Nilsson, S.; Schersten, T. (Sahlgrenska Sjukhuset, Univ. of Goeteborg, Sweden). *Scand. J. Clin. Lab. Invest.* 29(1):109-114, 1972.

The incorporation of ^{14}C-labeled glycerol into triglycerides and different classes of phosphoglycerides was determined in human liver slices. Replacement of palmitic acid by linoleic acid in the incubation medium resulted in a decrease of the glycerol incorporation rate into phosphoglycerides. In response to addition of bile acids or choline to the incubation medium, a change in the distribution of incorporated glycerol among the different phosphoglyceride classes was observed. The incorporation rate into ethanolamine-phosphoglyceride was decreased and into choline phosphoglyceride increased. This finding indicates that bile acids exert a different effect on the synthesis of phosphoglycerides in the liver.

0145 THE EFFECT OF PARATHYROID HORMONE ON HEPATIC CELL TRANSPORT OF CALCIUM. *(E.)* Chausmer, A. B.; Sherman, B. S.; Wallach, S. (State Univ. New York, Downstate Med. Cent., Brooklyn). *Endocrinology* 90(3):663-672, 1972.

0146 IRON AND PROTEIN IN SUBCELLULAR LIVER FRACTIONS DURING ACUTE AND CHRONIC LIVER DAMAGE. *(Ger.)* Kaszewska-Jablonska, I. (Med. Akad. Gdansk, Poland). *Ber. Ges. Inn. Med.* 26(22):311-313, 1970.

0147 REGULATION OF PHOSPHOENOLPYRUVATE SYNTHESIS FROM SUCCINATE IN GUINEA PIG LIVER MITOCHONDRIA. *(E.)* Garthoff, L.; Tobin, R. B.; Mehlman, M. A.; DeVore, V. (Univ. Nebraska Coll. Med. Omaha). *Proc. Soc. Exp. Biol. Med.* 139(4):1252-1257, 1972.

0148 ALIMENTARY PRODUCTION OF GALLSTONES IN HAMSTERS. *(E.)* Dam, H.; Prange, I.; Sondergaard, E. (Dept. Biochem. Nutr., Polytechnic Inst., Copenhagen, Denmark). *Z. Ernaehrugswiss.* 11(2):95-104, 1972.

0149 GROWTH PROMOTING EFFECT OF SERUM FROM PORTAL BLOOD ON LIVER CELLS *IN VITRO*. *(E.)* Lie, S. (Univ. Hosp., Oslo, Norway). *Eur. J. Clin. Invest.* 2:163-168, 1972.

0150 DEIODINATION OF THYROID HORMONES BY THE PERFUSED RAT LIVER. *(E.)* Hillier, A. P. (Physiol. Lab., Univ. Cambridge, England). *J. Physiol.* 222:475-485, 1972.

0151 RESPIROMETER FOR TISSUE CULTURES OF LIVER. *(E.)* Sandstroem, B. (Dep. Hum. Anat., Univ. Uppsala, Sweden). *Acta Physiol. Scand.* 84:145-150, 1972.

0152 LACTATE ELIMINATION AND O_2 CONSUMPTION OF THE LIVER IN NARCOTIZED DOGS. *(E.)* Kramer, K.; Driessen, G.; Brechtelsbauer, H.; Gerbl, B.; Linke, I. (Physiol. Inst. Univ. Muenchen, Germany). *Pfuegers Arch.* 330(3):195-205, 1971.

0153 THE EFFECT OF GAMMA RADIATION AND ACTINOMYCIN ON CORTISONE INDUCTION OF LIVER ENZYMES. *(E.)* Yatvin, M. B., Lamar, Jr., C.; Pitot, H. C. (Univ. Wisconsin, Madison). *Proc. Soc. Exp. Biol. Med.* 139(4):1220-1223, 1972.

0154 SELECTIVELY BLOCKED AND DES-HISTIDINE-GLUCAGONS: PREPARATION AND EFFECTS ON HEPATIC ADENYLATE CYCLASE ACTIVITY. *(E.)* Lande, S.; Gorman, R.; Bitensky, M. (Yale Univ. Sch. Med., New Haven, Ct.). *Endocrinology* 90(3):597-604, 1972.

0155 EXPERIMENTAL PRODUCTION OF AUTO-IMMUNE LIVER DAMAGE AND ITS CORRELATION WITH HUMORAL ANTIBODIES. *(E.)* Gupta, K. D.; Jatkar, P. R.; Agarwal, R. G.; Vyas, M. C. (Dep. Med., Univ. Rajasthan, India). *J Assoc. Physicians India* 19(6):425-429, 1971.

0156 THE PHARMACO-KINETICS OF TELEPAQUE METABOLISM: THE RELATION OF BLOOD CONCENTRATION AND BILE FLOW TO THE RATE OF HEPATIC EXCRETION. *(E.)* Dunn, C. R.; Berk, R. N. (Dept. Radiol., Univ. California, San Diego, Sch. Med. La Jolla). *Am. J. Roentgenol.* 114(4):758-766, 1972.

0157 EFFECT OF 5-DIAZOURACIL ON THE SYNTHETIC AND CATABOLIC UTILIZATION OF THYMINE IN RAT LIVER. *(E.)* Ferdinandus, J. A.; Weber, G. (Dept. Pharmacol., Indiana Univ. Sch. Med., Indianapolis, 46202) *Proc. Soc. Exp. Biol. Med.* 139(2):592-596, 1972.

0158 MIGRATION OF NUCLEAR RNA INTO ISOLATED MOUSE LIVER MITOCHONDRIA. *(E.)* Georgatsos, J. G. (Lab. Biochem., Theagenion Cancer Inst., Thessaloniki, Greece). *Proc. Soc. Exp. Biol. Med.* 139(2):667-669, 1972.

0159 LIPOGENESIS IN MONKEY LIVER AND ADIPOSE TISSUE. *(E.)* Glennon, J. E.; Gordon, E. S.; Shrango, E. (Lemuel Shattuck Hosp., Tufts Univ. Med. Sch. Boston, Mass. 02111). *Proc. Soc. Exp. Biol. Med.* 139(2):673-676, 1972.

0160 THE SYNTHESIS OF TAURINE FROM SULFATE III. FURTHER EVIDENCE FOR THE ENZYMATIC PATHWAY IN CHICK LIVER. *(E.)* Sass, N. L.; Marin, W. G. (Agr. Exp. Sta., West Virginia Univ., Morgantown). *Proc. Soc. Exp. Biol. Med.* 139(3):755-761, 1972.

0161 THE EFFECT OF α TOCOPHEROL ON ACUTE CARBON TETRACHLORIDE POISONING OF LIVER. *(Jap.)* Moriyama, M. (2nd Pathological Dept., Japan Medical College, Tokyo). *Nippon Ika Daigaku Zasshi* 39(2):146-163, 1972.

0162 RATES OF ELIMINATION OF SORBITOL AND ETHANOL IN THE CHOLINE-DEFICIENT FATTY LIVER. *(E.)* Hillbom, M. E.; Pikkarainen, P. H. (Res. Lab. State Alc. Monop. (Alko), Helsinki, Finland). *Scand. J. Clin. Lab. Invest.* 28(3):267-270, 1971.

0163 LIVER PARENCHYMAL CELL INJURY. 9. PHENOBARBITAL POTENTIATION OF ENDOPLASMIC RETICULUM DENATURATION FOLLOWING CARBON TETRACHLORIDE. *(E.)* Reynolds, E. S.; Ree, H. J.; Moslen, M. T. (Dep. Pathol. Peter Bent Brigham Hosp., Boston, Mass.). *Lab. Invest.* 26(3):290-299, 1972.

0164 THE CELLULAR ANALYSIS OF LIVER CARCINOGENESIS. 5. ULTRASTRUCTURAL ALTERATIONS WITHIN HEPATOCELLULAR CARCINOMA INDUCED BY ETHIONINE. *(E.)* Merkow, L. P.; Epstein, S. M.; Slifkin, M.; Farber, E.; Pardo, M. (William H. Singer Mem. Res. Inst. Allegheny Gen. Hosp., Pittsburgh, Pa.). *Lab. Invest.* 26(3):300-305, 1972.

0165 HEPATIC VASCULAR RESPONSE FOLLOWING COLLOID INJECTION. *(E.)* Conway, J. D.; Saba, T. M. (Univ. Illinois Coll. Med., Chicago). *Proc. Soc. Exp. Biol. Med.* 139(3):985-990, 1972.

0166 THE POSSIBLE SOURCES OF SERUM ACID PHOSPHATASE IN THE DOG FOLLOWING HEPATIC ISCHEMIA. *(E.)* Daniel, A. M.; Blevings, S.; Beaudoin, J.-G.; MacLean, L. D. (Roy. Victoria Hosp., Montreal, Quebec, Canada). *Proc. Soc. Exp. Biol. Med.* 139(3):894-898, 1972.

0167 ORTHOTOPIC LIVER ALLOGRAFT IN THE PIG (TWO YEARS RESULTS). *(E.)* Mazzoni, G.; Di Martino, C.; Demofonti, A.; Valli, A.; Melis, M. (Vittorio Emanuele III Hosp., Rome, Italy). *Chir. Gastroent.* 5(4):475-482, 1971.

0168 INTRAPORTAL HYDROCORTISONE AND PREDNISOLONE INFUSION IN LIVER DISEASES. (EXPERIMENTAL STUDY). *(Rus.)* Ostroverkhov, G. Ye.; Gasparyan, S. A.; Malyugin, E. F.; Rykov, V. I.; Reys, B. A.; Blinder, L. V. (N. I. Pirogov Moscow Med. Inst., USSR). *Vestn. Akad. Med. Nauk SSSR* 27(5):50-56, 1972.

0169 THE EFFECT OF BILIARY OBSTRUCTION ON THE DISTRIBUTION OF THE HEPATIC BLOOD FLOW AND RETICULOENDOTHELIAL SYSTEM IN DOGS. *(E.)* Ohlsson, E. G. (Malmoe Gen. Hosp., Malmoe, Sweden. *Acta Chir. Scand.* 138(2):159-164, 1972.

0170 EFFECT OF CHRONIC BILE DUCT OBSTRUCTION ON RENAL HANDLING OF CALCIUM AND MAGNESIUM. *(E.)* Better, O. S.; Massry, S. G. (Rambam Govt. Hosp., Haifa, Israel). *J. Lab. Clin. Med.* 79(5):794-800, 1972.

0171 THE ACTION OF DDT ON THE ACCUMULATION OF VITAMIN A IN THE LIVER. *(Fr.)* Ferrando, R.; Fourlon, C. (Ecole Nat. Veterinaire, Alfort, France). *Bull. Acad. Nat. Med. (Paris)* 155(5-6):117-120, 1971.

0172 HISTOENZYMATIC DETERMINATIONS PERFORMED ON HEPATOCYTES MAINTAINED IN HISTIOTYPICAL CULTURE. *(Fr.)* Verne, J.; Hebert, S. (no affil.) *Bull. Acad. Nat. Med. (Paris)* 155(21-22):504-510, 1971.

0173 GLYCOGEN IN THE LIVER DURING STARVATION: A HISTOCHEMICAL AND BIOCHEMICAL INVESTIGATION. *(E.)* Otter, W. den; Minjer, A. de (Dept. Pathol., St. Univ., Pasteurstr, 2, Utrecht, The Netherlands). *Anat. Rec.* 173(2):141-150, 1972.

0174 SYNTHESIS OF α-FETOPROTEIN BY LIVER, YOLK SAC, AND GASTROINTESTINAL TRACT OF THE HUMAN CONCEPTUS. *(E.)* Gitlin, D.; Perricelli, A.; Gitlin, G. M. (Dept. Pediatr., Univ. Pittsburgh Sch., Med. Pittsburgh, Pa.). *Cancer Res.* 32:979-982, 1972.

0175 CHANGES IN HEPATIC AND ERYTHROCYTE TRANSKETOLASE ACTIVITY AND THIAMINE CONCENTRATION OF THE LIVER IN EXPERIMENTAL DEFICIENCY OF WATER SOLUBLE VITAMINS. *(E.)* Bamji, M. S. (Natl. Inst. Nutr. Indian Council Med. Res., Hyderabad-7, India). *Int. J. Vit. Nutr. Res.* 42(2):183-189, 1972.

0176 PERFUSATE COMPOSITION AND STABILITY OF POLYRIBOSOMES IN PERFUSED LIVER. *(E.)* VanDenBorre, M.; Webb, T. E. (Dept. Physiol. Chem., Ohio St. Univ. Coll. Med., Columbus, Ohio). *Life Sci.* 11(pt.2):347-354, 1972.

0177 BILIARY EXCRETION OF AMPICILLIN IN THE ANESTHETIZED DOG I. EFFECT OF SERUM AMPICILLIN CONCENTRATION, TAUROCHOLATE INFUSION RATE, BILIARY SECRETION PRESSURE, AND SECRETION INFUSION. *(E.)* Mandiola, S.; Johnson, B. L.; Winters, R. E.; Longmire, W. P., Jr. (Dept. Surg., UCLA Sch. Med., Los Angeles, Calif.). *Surgery* 71(5):664-674, 1972.

0178 COMPARATIVE STUDY OF TWO PROCEDURES USED IN THE DETERMINATION OF HEPATIC MICROSOMAL ANILINE HYDROXYLATION. *(E.)* Chhabra, R. S.; Gram, T. E.; Fouts, J. (Natl. Inst. Environ. Health Sci., Natl. Insts. Health, N.C.). *Toxicol. Appl. Pharmacol.* 22(1):50-58, 1972.

See also 0013, 0018, 0025, 0045, 0080, 0136, 0137, 0234, 0523, 0654, 0678, 0680, 0687, 0811, 0832

SECRETION AND METABOLISM

Intestine

0179 INTESTINAL GAS PRODUCTION FOLLOWING INGESTION OF FRUITS AND FRUIT JUICES. *(E.)* Hickey, C. A.; Calloway, D. H.; Murphy, E. L. (Dept. of Natural Sci., Univ. of California, Berkeley). *Am. J. Dig. Dis.* 17(5):383-389, 1972.

Breath hydrogen and rectal flatus analysis was used to measure human intestinal gas production following ingestion of test meals of five fruit juices and two fruits. Only orange juice and apricot nectar of the juices fed were without effect on one or more of these parameters. Apple juice caused an increase in hydrogen production in all subjects and an increase in rectal flatus in 4 of 5 subjects tested. Grape juice, raisins and bananas significantly elevated hydrogen production. Prune juice caused diarrhea and a very large increase in breath hydrogen. No variations in carbohydrate and organic acid composition were found which could account for the differences in intestinal gas production, but fruits contain many components which have not been identified.

0180 SITE OF VITAMIN D ACTION IN CHICK INTESTINE. *(E.)* Hurwitz, S.; Bar, A. (Volcani Inst. of Agr. Res., Bet Dagan, Israel). *Am. J. Physiol.* 222(3):761-767, 1972.

Yttrium 91 was used as a nonabsorbed reference substance to measure intestinal calcium and phosphate absorption in vivo in vitamin D_3-treated chicks and in nontreated controls. The effect of vitamin D on phosphate absorption appeared to be independent from that on calcium absorption. Calcium, but not phosphate, absorption was higher in rachitic chicks given a single dose of vitamin D_3 than in chicks continuously fed with the vitamin. In the jejunum and ileum, the absorption of both calcium and phosphate was concentration dependent. The absorption-concentration relationship of calcium in the jejunum was not significantly influenced by vitamin D_3 but in the ileum the latter stimulated a calcium transport process which was not concentration dependent, although the net transport of calcium in this segment was limited. Vitamin D increased the concentration-dependent phosphate transport in the jejunum, suggesting an enhancement of phosphate permeability in this segment. With ^{45}Cd administration, in addition to yttrium 91 feeding, the in vivo unidirectional fluxes of calcium were estimated for the various intestinal segments. In the duodenum, both fluxes of calcium were increased by vitamin D. The applicability of calculating the calcium fluxes by the present method is discussed.

0181 ORGAN CULTURE OF RABBIT SMALL INTESTINE: PROLONGED IN VITRO STEADY STATE PROTEIN SYNTHESIS AND SECRETION AND SECRETORY IgA SECRETION. *(E.)* Kagnoff, M.F.; Donaldson, R.M., Jr.; Trier, J.S. (Univ. California, San Diego Sch. Med., La Jolla, Calif.). *Gastroenterology* 63(4):541-551, 1972.

Biopsies of rabbit jejunal mucosa were cultured for 24 hr with maintenance of mucosal architecture using organ culture techniques. Villous epithelial cells and most lamina propria lymphoid cells were structurally normal although crypt epithelial cells often showed focal degeneration after 24 hr. Incorporation of radiolabeled leucine and glucosamine into protein and glycoprotein was linear with time. After 3 to 6 hr of incubating, radiolabeled protein was secreted steadily into the culture medium during the subsequent 12 to 24 hr. De novo protein synthesis and secretion were inhibited by cycloheximide. Biopsies cultured in ^{14}C-labeled leucine secreted intact radiolabeled secretory IgA into the culture medium. Secretory IgA-^{14}C was purified from concentrated medium by sequential column chromatography. This material uniformly gave a single radioactive precipitin arc by immunodiffusion and immunoelectrophoresis with specific antibodies against rabbit secretory IgA, secretory component, or α chain. This organ culture offers considerable advantage over all previously described intestinal preparations since in vitro synthesis secretion of macromolecules by intestinal mucosa can be studied for significantly longer periods.

0182 EFFECT OF ETHANOL ON THE RESPIRATION OF ISOLATED EPITHELIAL CELLS IN THE RAT INTESTINE. *(Fr.)* Tuan, T. V.; Mitjavila, M. T.; Derache, R. (I.N.S.E.R.M., Institut de Physiologie, 31-Toulouse). *C. R. Soc. Biol. Toulouse* 165(9-10): 2011-2014, 1971.

The effect of ethanol on the metabolism of isolated epithelial cells from the rat intestine was examined. Isolated cells were obtained by incubating an intestinal segment with 2.5 mM ethylenediaminetetraacetic acid in saline solution at 5°C for 20 min., and were incubated in Warburg flasks with Krebs-Ringer solution in the presence or absence of ethanol (8-32 g/l). The inhibition of cellular respiration observed was essentially proportional to the ethanol concentration, at 8% for 8 g/l and 36% for 32 g/l. Lactic acid production by the cells was also significantly reduced; however, the reduction in glucose consumption was not statistically significant. These changes may be attributed to changes in cell wall permeability produced by ethanol, thus modifying the energy exchange of the cell.

0183 THE MICROFLORA OF THE HUMAN ILEUM AND INTRA-ABDOMINAL COLON: RESULTS OF DIRECT NEEDLE ASPIRATION AT SURGERY AND EVALUATION OF THE TECHNIQUE. *(E.)* Bentley, D. W.; Nichols, R. L.; Condon, R. E.; Gorbach, S. L. (Winnipeg Gen. Hosp., Winnepeg 3, Manitoba, Canada). *J. Lab. Clin. Med.* 79(3):421-429, 1972.

In 10 patients undergoing elective cholecystectomy, the microflora of the terminal ileum, cecum, and transverse colon was obtained by direct needle aspiration of the bowel; the results were compared with the microbial counts in the feces. Facultative bacteria and obligate anaerobes were generally 10^2-10^4 times more frequent in the feces than in the intra-abdominal colon. The microbial counts in the transverse colon and cecum were similar. The terminal ileum harbored a relatively sparse flora, contrasting with the large concentrations of microorganisms on the other side of the ileocecal valve. Studies in dogs revealed that the needle aspiration technique could obtain reproducible samples for bacteriologic study that differed by less than a factor of 10 from direct intraluminal specimens. The addition of nonabsorbable markers to the diluting fluid used for aspirating bowel contents somewhat increased the accuracy of the method.

0184 UTILIZATION OF ^{14}C-LABELED *E. coli* BY THE RAT CECUM AND AFTER FORCE-FEEDING. *(E.)* Yang, M. G.; Bergen, W. G.; Sculthorpe, A. E.; Mickelsen, O. (Dep. Food Sci. Hum. Nutr., Michigan State Univ., East Lansing). *Proc. Soc. Exp. Biol. Med.* 139(4):1312-1316, 1972.

0185 DIETARY SUGARS AND INTESTINAL ENZYMES. *(E.)* Rosensweig, N. S. (St. Luke's Hosp. Center, New York City). *J. Am. Diet. Assoc.* 60:483-486, 1972.

0186 EXPERIMENTAL STUDIES IN SMALL INTESTINE TRANSPLANT: STATE-OF-THE-ART. *(It.)* Mosella, G.; Masella, A.; Collarino, A. (U. Napoli, Naples, Italy). *Riforma Med.* 86(20):790-800, 1972.

0187 THE RELEASE AND FATE OF THE INTESTINAL LYSOSOMAL ENZYMES AFTER ACUTE ISCHEMIC INJURY OF THE INTESTINE. *(E.)* Abe, H.; Carballo, J.; Appert, H. E.; Howard, J. M. (Dept. Surg., Hahnemann Med. Col. Phila. Pa.). *Surg. Gynecol. Obstet.* 135(4):581-585, 1972.

See also 0026, 0080

GENERAL

0188 THE REACTIONS OF THE GASTRIC VASCULAR BED ON VENOUS OR ARTERIAL PRESSURE ELEVATION AND THEIR COMPARISON WITH VALUES OF THE SPLENIC AND INTESTINAL CIRCULATORY SYSTEM. *(Ger.)* Lutz, J.; Biester, J. (Physiol. Inst. Univ. Wuerzburg, Germany). *Pfluegers Arch.* 330(3):230-242, 1971.

0189 REACTIONS WITHIN CONSECUTIVE VASCULAR SECTIONS OF THE SMALL INTESTINE OF THE CAT DURING PROLONGED HYPOTENSION. *(E.)* Haglund, U.; Lundgren, O. (Dep. Physiol., Univ. Goeteborg, Sweden). *Acta Physiol. Scand.* 84:151-163, 1972.

0190 EFFECT ON PROSTAGLANDINS E_1 AND A_1 ON THE GASTRIC CIRCULATION IN DOGS. *(E.)* Nakano, J.; Prancan, A. V. (Univ. Oklahoma Sch. Med., Oklahoma City). *Proc. Soc. Exp. Biol. Med.* 139(4):1151-1154, 1972.

0191 THE EFFECT OF STOMACH DISTENSION ON THE EFFERENT ACTIVITY IN THE CHORDA TYMPANI NERVE OF THE RAT. *(E.)* Hellekant, G. (Veterinaerhoegsk., Stockholm, Sweden). *Acta Physiol. Scand.* 83(4):527-531, 1971.

0192 SURGICAL ANATOMY OF THE ABDOMINAL AORTA. *(Sp.)* Fernandez-Cruz, L.; Astudillo, E.; Pera, C. (Fac. Med., Univ. Barcelona, Spain). *Rev. Esp. Enferm. Apar. Dig.* 37(5):551-562, 1972.

0193 TRANSUMBILICAL PORTOGRAPHY. ANATOMICAL STUDY OF THE OMPHALO-PORTAL JUNCTURE. *(Sp.)* Ferreira Montero, V.; Lavoie, P. (Hosp. St. Luc, Montreal, Canada). *Rev. Esp. Enferm. Apar. Dig.* 37(5):563-577, 1972.

0194 *IN VIVO* MICROSCOPY OF THE GASTRIC MICROCIRCULATION. *(E.)* Guth, P. H.; Rosenberg, A. (VA Hosp., Los Angeles, Calif.). *Am. J. Dig. Dis.* 17(5):391-398, 1972.

0195 THE ACTION OF VASOPRESSIN ON THE GASTROINTESTINAL TRACT. *(E.)* Schapiro, H.; Britt, L. G. (Memphis VA Hosp., Memphis, Tenn.). *Am. J. Dig. Dis.* 17(7):649-668, 1972.

0196 A METHOD FOR THE ISOLATION OF PERITONEAL RAT MAST CELLS. SEMIQUANTITATIVE CYTOLOGIC EVALUATION OF THEIR *IN VITRO* REACTIVITY. *(Fr.)* De Montis, G.; Renoux, M. C. (Lab. Immunol. Gen. Pathol. Exper., Paris, France). *Path. Biol. (Paris)* 20(9/10):523-529, 1972.

See also 0047, 0112, 0152, 0154, 0283, 0286, 0352, 0535

DIAGNOSTIC PROCEDURES

0197 EXPERIENCE WITH THE OLYMPUS ESOPHAGOSCOPE (EF). A CORRELATION OF RADIOGRAPHIC AND ENDOSCOPIC FINDINGS. *(E.)* Thomas, E.; Hislop, I. G.; Grant, A. K. (Queen Elizabeth Hosp., Woodville, S. Australia 5011). *Am. J. Dig. Dis.* 17(1):43-48, 1972.

The Olympus Esophagoscope (EF) was used to perform 137 examinations on 117 patients. The optical system of the instrument allowed for excellent viewing of the esophagus, upper regions of the stomach and gastrojejunal anastomoses. However, it is too short for proper visualization of the pyloroantral region in many patients. Biopsies tend to be insufficient for histologic interpretation. The push-button controls for fluid and air insufflation and suction simplify its use. Forty-three esophageal and 68 gastric lesions were seen; multiple pathology was observed in several instances. The endoscopic findings have been compared with results from radiographic studies. Intubation failed in 7 cases. No abnormality was detected on 31 occasions.

0198 EVALUATION OF THE LIVER AND SPLEEN IN HODGKIN'S DISEASE I. THE VALUE OF HEPATIC SCINTIGRAPHY. *(E.)* Lipton, M. J.; DeNardo, G. L.; Silverman, S.; Glatstein, E. (Stanford Univ. Sch. of Med. Stanford, Cal.). *Am. J. Med.* 52(3):356-361, 1972.

In 49 patients with Hodgkin's disease exploratory laparotomy including needle and wedge liver biopsies were performed for staging purposes, and the pathologic condition of the liver was compared with the preoperative liver scans. Focal filling defects on the liver scintigraph were always associated with hepatic Hodgkin's disease, although this abnormality on the scintigraph occurred infrequently. A nonuniform uptake of radioactivity in the liver was the most common sign of liver disease, but this was not specific for Hodgkin's disease and was often associated with liver granulomas. Hodgkin's disease was never found in the liver biopsy specimens of the patients in this series in whom the liver scintigraph was normal. Laparotomy with liver biopsy remains the most specific means for staging abdominal Hodgkin's disease.

0199 MECHOLYL TEST:COMPARISON OF BALLON KYMOGRAPHY AND INTRALUMINAL PRESSURE MEASUREMENT. *(E.)* Shepherd, J.K.; Dimant, N.E. (Dept. Med., Toronto Western Hosp., Ontario, Can.) *Gastroenterology* 63(4):557-563, 1972.

Simultaneous measurements obtained by ballon kymography and intraluminal esophageal manometry were compared to study the positive methacholine response of the esophagus in patients with achalasia. Prior to this, mechanical characteristics of the ballon-kymography system were assessed, in particular the (nonlinear) response of the system to external pressure on the balloon. Little change in balloon volume occurs until external pressure reaches approximately 15 mm Hg. Thereafter, rapid emptying of the balloon occurs over the next 5 to 10 mm Hg and the balloon is totally collapsed at approximately 25 mm Hg or its water equivalent, 34 cm. External pressures above this level cannot be appreciated by the collapsed balloon. These features were demonstrated in 6 patients with achalasia. It is suggested that a positive response to methacholine may be defined as a rise in esophageal intraluminal pressure to greater than 25 mm of mercury or its water equivalent. Accurate definition of esophageal sensitivity to methacholine and its usefulness as a diagnostic tool must await more quantitative studies.

0200 A BALLON-OCCLUDABLE T-TUBE FOR CHOLANGIOGRAPHY AND QUANTITATIVE COLLECTION AND REINFUSION OF BILE IN MAN. *(E.)* Soloway, R.D.; Carlson, H.; Schoenfield, L.J. (Mayo Clinic and Mayo Foundation, Rochester, N.Y.). *J. Lab. Clin. Med.* 79(5):500-504, 1972.

A reinfusion lumen was added to the balloon-occludable Baldwin T-tube to enable maintenance of enterohepatic circulation in man during quantitative collection of bile. The modified Baldwin T-tube was used without adverse sequelae in four cholecysectomy patients, and obviated the need for nasointestinal tubes, which may disturb intestinal physiology and are cumbersome when used for a period of days. Injection of sodium diatrizoate demonstrated complete bile duct occlusion by the distended ballon and provided excellent radiographic visualization of the intrahepatic biliary tree and distal common duct. Potential applications of the balloon-occulsion cholangiographic technique include the detection of retained gallstones and intraductal neoplasms and the evaluation of sclerosing cholangitis, primary biliary cirrhosis, and intrahepatic ductal alterations.

0201 VARICES OF THE GREATER CURVATURE OF THE STOMACH: RADIOLOGIC SYMPTOMATOLOGY. *(It.)* Pecunia, C.; Pablica, P.; Teofoli, B.; Viglietta, G.; Morselli, V.; Tonti, R. (Ist. Radiol. "L. Galvani" Univ. Bologna, Italy). *Ann. Radiol. Diagn.* 44(1):59-99, 1972.

0202 A NEW, EARLY, RELIABLE SIGN OF HYPERTROPHIC PYLORIC STENOSIS. *(Fr.)* Deffrenne, P. (Lyon, France). *Pediatrie* 27(1):43-48, 1972.

0203 INTESTINAL ENDOSCOPY. *(E.)* Demling, L.; Classen, M.; Koch, H.; Deyhle, P. (Dep. Med., Univ. Erlangen-Nuernberg, Erlangen, Germany). *Rend. Gastroenterol.* 3:178-182, 1971.

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0205 DIAGNOSTIC ACCURACY OF PANCREATIC SCANNING *(E.)* Espiritu, C. R.; Rolfs, H. E. (Mt. Sinai Hosp., Miami Beach, Fla.). *Am. J. Dig. Dis.* 17(6):539-543, 1972.

0206 THE LATERAL VIEW IN THE RADIOLOGY OF THE RECTUM AND RECTOSIGMOID. *(E.)* Craig, J. O. M. C.; Highman, J. H.; Palmer, F. J. (St. Mary's Hosp., London, England). *Br. J. Surg.* 58(12):908-912, 1971.

0207 THE USE OF THE GASTROSCOPE IN THE DIAGNOSIS OF SOME PRECANCEROUS LESIONS OF THE STOMACH OF SURGICAL IMPORTANCE. *(E.)* Montori, A.; Viceconte, G. (Dep. Clin. Surg., Univ. Roma, Italy). *Chir. Gastroenterol.* 5(4):466-474, 1971.

0208 ENDOSCOPY DURING OPERATION: NEW DIAGNOSTIC POSSIBILITIES. PRELIMINARY REPORT. *(E.)* Marcozzi, G.; Montori, A. (III Surg. Dep., Univ. Rome, Italy). *Chir. Gastroenterol.* 6(1):24-28, 1972.

0209 EXOCRINE PANCREATIC FUNCTION STUDIES, DUODENAL CYTOLOGY, AND HYPOTONIC DUODENOGRAPHY IN THE DIAGNOSIS OF SURGICAL JAUNDICE. *(E.)* Bourke, J. B.; Swann, J. C.; Brown, C. L.; Ritchie, H. D. (Gen. Hosp., Nottingham, England). *Lancet* (7751):605-608, 1972.

0210 A TRIAL EVALUATION OF THE CONDITION OF THE LIVER USING A SIMPLE SERUM REACTION WITH URANYL ACETATE. *(Pol.)* Hankiewicz, J.; Bujniewicz, E. (Miejskiego Lab. Anal., Katowice, Poland). *Pol. Tyg. Lek.* 26(48):1847-1849, 1971.

0211 A NEW STAGE IN GASTROENTEROLOGY: THE ERA OF FIBROSCOPES. *(Fr.)* Debray, Ch.; Paolaggi, J. A.; Housset, P. (Hospital Bichat, Clin. Mal. App. Dig., Paris, France). *Bull. Acad. Nat. Med. (Paris)* 155(24-25):583-587, 1971.

0212 ELECTROSPLANCHNOGRAPHY (ESG) AND ELECTROGASTROENTEROGRAPHY (EGEG). *(Sp.)* Galan Navarro, J. L. (no affil.) *Rev. Esp. Enferm. Apar. Dig.* 36(5):587-592, 1972.

0213 ARTERIOGRAPHIC IDENTIFICATION OF THE HYDATID CYST IN THE LIVER. *(Sp.)* Muro, J., San Martin, P.; Ortiz Vazquez, J.; Mino, G.; Mardomingo, P.; Duran, A. (Clin. "La Paz", Seguridad Soc., Madrid, Spain). *Rev. Esp. Enferm. Apar. Dig.* 37(1):1-22, 1972.

0214 MUCOSA OF NORMAL AND PATHOLOGICAL SMALL INTESTINE SAMPLED BY PERORAL BIOPSY-OPTICAL MICROSCOPIC STUDY. *(Fr.)* Monges, H.; Laffargue, P.; Chamlian, A.; Cougard, A. (Hop. Nord, Marseille, France). *Presse Med.* 79(55):2553-2555, 1971.

0215 DUODENOSCOPY, RETROGRADE CHLANGIO-PANCREATOGRAPHY. *(Ger.)* Safrany, L. (Med. Klin., Semmelweis-Univ., Budapest, Hungary). *Schweiz. Med. Wochenschr.* 102(25):872-877, 1972.

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0225 GASTRIC ASSESSMENT OF PROSPECTIVE RENAL-TRANSPLANT PATIENTS. *(E.)* Gordon, E. M.; Johnson, A. G.; Williams, G. (Charing Cross Hosp., London, England). *Lancet* (7744):226-229, 1972.

0226 SOURCES OF ERROR IN DIAGNOSTIC SCINTIGRAMS OF THE THYROID, LIVER, AND BRAIN. *(E.)* Haynie, T. P.; Jhingran, S. G.; Jahns, M. F. (Anderson Hosp. Tumor Inst., Univ. Texas, Houston). *Tex. Med.* 68(3):132-136, 1972.

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0228 IMPROVED TECHNIQUE FOR DETECTING AUSTRALIA ANTIGEN BY IMMUNOELECTROOSMOPHORESIS. *(E.)* Hansson, B. G.; Johnsson, T. (Univ. Lund, Malmo Gen. Hosp., Malmo, Sweden). *Vox Sang.* 21(6):531-539, 1971.

0229 APPLICATION OF MAXIMAL ACID SECRETORY TESTS TO PROBLEMS OF DYSPEPSIA IN UGANDA. *(E.)* Kajubi, S. K,; Dutt, B. (Makerere Med. Sch. Mulago Hosp., Uganda). *East Afr. Med. J.* 48(11):617-621, 1971.

0230 COMPARISON OF COUNTERELECTROPHORESIS AND HEMAGGLUTINATION INHIBITION TESTS FOR HEPATITIS-ASSOCIATED ANTIGEN. *(E.)* Shaffer, W. E.; Vyas, G. N.; Shahed, A.; Chen, E.; Perkins, H. A. (Dep. Clin. Pathol. Lab. Med., Univ. California, San Francisco). *Vox Sang.* 22:366-370, 1972.

0231 EVALUATION OF THE EFFECTIVENESS OF HEPATITIS SCREENING TESTS. *(E.)* Miller, W. V.; Watson, L. E.; Holland, P. V.; Walsh, J. H. (Clin. Cent., NIH Bethesda, Md.). *Vox Sang.* 21:1-10, 1971.

0232 CLINICAL USEFULNESS OF GASTRIC ACID SECRETORY TESTS. *(E.)* Brooks, F. P. (Univ. Pennsylvania Sch. Med., Philadelphia). *Postgrad. Med.* 51(2): 188-193, 1972.

0233 EVALUATION OF THE LIVER AND SPLEEN IN HODGKIN'S DISEASE. II. THE VALUE OF SPLENIC SCINTIGRAPHY. *(E.)* Silverman, S.; DeNardo, G. L.; Glatstein, E.; Lipton, M. J. (Naval Hosp., Philadelphia, Pa.). *Am. J. Med.* 52(3):362-366, 1972.

0234 THE MODIFICATION OF THE DOUBLE BALLOON DUODENAL TUBE FOR MEASUREMENTS OF PANCREATIC AND BILARY OUTPUTS AND STUDIES OF THE ENTEROHEPATIC CIRCULATION AND INTESTINAL ABSORPTION IN MAN. *(Ger.)* Klapdor, R.; Bartelheimer, H. (Med. Klin., Univ. Hamburg, Germany). *Klin. Wochenschr.* 9(21):1186-1187, 1971.

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0236 DIAGNOSTIC VALUE OF ENDOSCOPIC PANCREATOGRAPHY. *(Ger.)* Classen, M.; Koch, H.; Demling, L. (Med. Klin. Poliklin., Univ. Erlangen-Nuernberg, Erlangen, Germany). *Leber Magen Darm* 2(3):79-81, 1972.

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0240 ENDOSCOPY IN HEMORRHAGIC GASTRITIS. *(Sp.)* Alcala-Santaella, R.; Castellanos Franco (Ciudad Sanit. Prov. "Francisco Franco", Madrid, Spain). *Rev. Esp. Emferm. Apar. Dig.* 37(4):467-472, 1972.

0241 EARLY DIAGNOSIS OF DIGESTIVE TRACT CANCER. *(Sp.)* Meeroff, M. (Serv. Gastroenterol. Centro Gallego Buenos Aires, Argentina). *Hispalis Med.* 29(334):249-272, 1972.

0242 PERORAL BIOPSY OF THE SMALL INTESTINAL MUCOSA. *(Fr.)* Berman, H.; Cerf, M. (Hop. Bichat Paris, France). *Gaz. Hop.* 144(14/15):-483-487, 1972.

0243 RADIOLOGY WITHOUT X-RAYS: CONTRIBUTION OF TOMOECHOGRAPHY TO SURGICAL ABDOMINAL DIAGNOSTICS. *(Fr.)* Weill, F.; Becker, J.-C.; Kraehenbuhl, J. R.; Gillet, M. (Hosp. Ctr., U. Besancon, France). *J. Chir. (Paris)* 104(1-2):55-66, 1972.

0244 EXPERIENCE WITH THE BIOPTIC GASTROFIBROSCOPE. *(Cz.)* Jirasek, V.; Dvorakova, H.; Setka, J.; Bednar, B.; Blazek, O. (Fac. Gen. Med. Charles U. Prague, Czechoslovakia). *Cesk. Gastroent. Vyz.* 26(5):193-202, 1972.

0245 CLINICAL MEANING OF THE NON-CONTRASTING GALLBLADDER DURING X-RAY EXAMINATION. *(Cz.)* Bruna, J.; Brunova, E. (Na Bulovce Hosp., Prague, Czechslovakia). *Cesk. Gastroent. Vyz.* 26(5):203-210, 1972.

0246 ANAPHYLACTOID REACTIONS INDUCED BY In^{113m} AND Au^{198} RADIOPHARMACEUTICALS USED FOR LIVER SCANNING. *(E.)* Raiciulescu, N.; Niculescu-Zinca, D.; Stoichita-Papilian, M. (N. Gh. Lupu Inst. Int. Med., Bucharest, Rumania). *Rev. Roum. Med. Int.* 9(1):55-60, 1972.

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0248 RETROBULBAR DUODENAL ULCER. *(Pol.)* Leszczynska, M. (Sixth Local Hosp. Warsaw, Poland). *Pol. Przegl. Radiol.* 36(3):353-362, 1972.

0249 THE LUGOL TEST AND G IMMUNOGLOBULINS IN HEPATOLOGY. CRITICAL ANALYSIS OF A CLINICAL, BIOLOGICAL, AND STATISTICAL STUDY OF 160 DETERMINATIONS. *(Fr.)* Sambin, P.; Nyssen, M.; Monnier, C. R.; Trepo, Ch.; Chapuy, H.; Girard, M. (Hop. Croix-Rousse, Lyon, France). *J. Med. Lyon* 53(1225):371-398, 1972.

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0252 DETECTING GASTROESOPHAGEAL REFLUX BY pH RECORDING AND ACID REFLUX TEST. *(E.)* Jahadi, M. R.; Chandler, J. P. (Memorial Hosp., Worcester, Mass.). *Am. Surgeon* 38(5):281-284, 1972.

0253 *IN VIVO* VITAL STAINING AS AN AID TO IDENTIFICATION OF ESOPHAGOGASTRIC MUCOSAL JUNCTION IN MAN. *(E.)* Nothmann, B. J.; Wright, J. R.; Schuster, M. M. (Baltimore City Hosp., Baltimore, Md.). *Am. J. Dig. Dis.* 17(10):919-924, 1972.

0254 MEASUREMENT OF THE DIAMETER OF THE PYLORUS IN MAN. *(E.)* Salessiotis, N. (Asclepeion of Athens (Private Hosp.) Athens, Greece). *Am. J. Surg.* 124(3):331-333, 1972.

0255 QUANTITATION OF AN HEPATIC ABSCESS BY A-MODE ULTRA-SOUND: REPORT OF A CASE. *(E.)* Gottlieb, S. (Univ. Miami, Jackson Memorial Hosp., Miami, Fla.). *Am. Surgeon* 38(5):292-294, 1972.

0256 PERCUTANEOUS TRANSHEPATIC CHOLANGIOGRAPHY. EXPERIENCE WITH 102 PROCEDURES. *(E.)* Hines, C., Jr.; Ferrante, W. A.; Davis, Jr., W. D.; Tutton, R. A. (Alton Ochsner Med. Found., New Orleans, La.). *Am. J. Dig. Dis.* 17(10):868-874, 1972.

0257 pH PROFILE OF GUT AS MEASURED BY RADIOTELEMETRY CAPSULE. *(E.)* Rees, W. D.; Jenkins, S. T. H. (Llanidloer, Mont., U.K.). *Br. Med. J.* 2(5805):104-105, 1972.

0258 FIBER OPTIC GASTROSCOPY IN PATIENTS AFTER GASTRIC RESECTION. *(It.)* Montori, A.; Moscarini, M.; Viceconte, G.; Battisti, G. (Clin. Chirurg. dell Univ. Roma). *Prog. Med.* 28:155-157, 1972.

0259 FIBER OPTIC ESOPHAGOSCOPY IN THE STUDY OF ESOPHAGEAL DISORDERS. *(It.)* Montori, A.; Moscarini, M.; Battisti, G. (Clin. Chirurg. dell Univ. Roma.). *Prog. Med.* 28:49-51, 1972.

0260 DUODENOSCOPY AND TRANSPAPILLARY CATHETERIZATION OF THE BILIARY AND PANCREATIC DUCTS. *(Fr.)* Gaucher, P.; Jeanpierre, R.; Laurent, J.; Fourati, R.; Heully, F. (Hop. St-Julien, Nancy, France). *Tunis. Med.* 50(1):47-52, 1972.

0261 THE USE AND SIGNIFICANCE OF SOME LABORATORY TESTS IN THE DETECTION OF VIRAL HEPATITIS DURING MASS EXAMINATIONS. *(It.)* Ferro, V. (Univ. Studi Napoli, Italy). *Ig. Mod.* 44(7-12): 98-114, 1972.

0262 INFRACAPSULAR HEMATOMA OF THE LIVER. *(Fr.)* Le Neel, J. C.; Leborgne, J.; Mousseau, M. (Clin. Chir. Hotel-Dieu, Nantes, France). *Nouv. Presse Med.* 1(23):1583-1586, 1972.

See also 0018, 0053, 0102, 0131, 0263, 0264, 0268, 0338, 0339, 0348, 0350, 0366, 0405, 0423, 0528, 0570, 0600, 0617, 0621, 0624, 0735, 0808, 0905

GASTROINTESTINAL DISEASES

ESOPHAGUS

0263 A TEST OF GASTROESOPHAGEAL SPHINCTER COMPETENCE. THE COMMON CAVITY TEST. *(E.)* Butterfield, D.G., Struthers, Jr., J.E.; Showalter, J.P. (Veterans Admin. Hospital, Denver, Colo.). *Am. J. Dig. Dis.* 17(5):415-421, 1972.

Gastroesophageal manometry using continuously perfused polyvinyl tubes, and acid reflux (pH test) were studied prospectively in 13 patients with symptoms and/or signs of gastroesophageal reflux and 14 without. Pressures were recorded simultaneously from stomach, gastroesophageal sphincter and distal esophagus at rest and during gradual abdominal compression to 80 mm Hg. Neither the mean resting pressures nor the mean increase in gastric or sphincter pressures, during abdominal compression, differed significantly, and sphincter yield pressures did not separate the 2 groups. However, the mean esophageal pressure rise was significantly greater ($P<0.001$) in the symptomatic patients (34 ± 4.5 vs 9.9 ± 3.2 mm Hg). The mean pressure in the stomach, sphincter and esophagus became almost identical in the symptomatic patients--a "common cavity" formed between stomach and esophagus. Two symptomatic patients had negative pH but positive common cavity tests. No asymptomatic patient had evidence of either reflux or a positive common cavity test.

0264 ESOPHAGEAL VARICES. ENHANCED RADIOLOGIC VISUALIZATION BY ANTICHOLINERGIC DRUGS. *(E.)* Ghahremani, G.G., Port, R.B.; Winans, C.S.; Williams, J.R. (Univ. of Chicago Hosp., Ill.). *Am. J. Dig. Dis.* 17(8):703-712, 1972.

The value of propantheline bromide and atropine sulfate was assessed in the diagnosis of esophageal varices when conventional esophagography did not show definitive findings. Twenty patients and 20 control subjects were examined prior to and shortly after these anticholinergic drugs were administered. Visualization of varices was improved remarkably in all 15 patients in whom varices were confirmed on subsequent esophagoscopy. The pharmacoradiologic basis for this method and its significance in the accurate diagnosis of esophageal varices are discussed. Gastroesophageal reflux was frequent after injection of anticholinergic drugs. The size of the varices increased after anticholinergic administration, aiding in differentiation from nonvascular esophageal folds.

0265 SOME PROBLEMS IN SURGICAL MANAGEMENT OF CHILDREN WITH HIATUS HERNIA. *(E.)* Lari, J.; Lister, J. (The Childrens Hosp., Sheffield, England). *Arch. Dis. Child.* 47(252):201-206, 1972.

Thirty-three cases of hiatus hernia treated by operation in an 8-year period are reviewed. Associated developmental anomalies were noted in 10 cases. Less delay in surgical intervention when a child is not responding to medical management might reduce the number of children who develop strictures as a result of gastroesophageal reflux and might improve the development of the child. Gastric fixation with gastrostomy not only improves the nutrition of a child before a major corrective procedure, but in a few cases may avoid more drastic operation. Though maximal acid secretion tests do not help to identify those cases likely to develop a stricture, it is, however, a useful procedure in indicating whether or not vagotomy should be added to fundal plication. Vagotomy and pyloroplasty were added to fundal plication in all children of this series who were high acid secretors. Surgical management was regarded as satisfactory in 88% of the cases.

0266 THE AUTONOMIC NERVOUS SYSTEM IN ESOPHAGEAL ACHALASIA. *(E.)* Lise, M.; Perrino, G.; Cordioli, G. P.; Cagol, P. P. (Surg. Dept., Univ. of Padua, Italy). *Chir. Gastroent.* 6(2):103-110, 1972.

The nervous structures of the terminal protion of the esophagus of some patients with esophageal achalasia, operated on with myotomy according to Heller, were studied comparatively. Both traditional histological methods and newer histochemical methods for detection of adrenergic and cholinergic activity were used. It has been possible to demonstrate that in esophageal achalasia, the few ganglion cells that can be demonstrated histologically do not display any AchE activity. The adrenergic fibres, however, seem to maintain their characteristic morphology and function. The results appear to agree with the hypothesis that the disorder is the consequence of a primary vagal alteration.

0267 THE EFFECT OF DENERVATION ON FELINE ESOPHAGEAL FUNCTION AND MORPHOLOGY. *(E.)* Burgess, J.N., Schlegel, J.F.; Ellis, F.H. (Mayo Clinic, Rochester, Minn.). *J. Surg. Res.* 12(1):24-33, 1972.

Denervation of the feline esophagus (bilateral excision of vagal sections, stripping of vagal nerve trunks from the esophageal wall, or bilateral celiac ganglionectomy and excision of the sympathetic chain from above the azygos vein to the diaphragm) leads to a severe motility disorder. The disorder in cats in different from that found in dogs and monkeys. The body of the esophagus was completely paralyzed after bilateral cervical vagotomy, but peristalsis returned to the smooth-muscle portion. Esophageal dilatation was accompanied by attenuated relaxation and contraction of the inferior sphincter in response to swallowing. Sphincter abnormalities disappeared in 6 months, but the body of the esophagus remained abnormal. Esophagomyotomy did not prevent esophageal dilatation. Effects of periesophageal vagotomy were variable. Sympathectomy, while not greatly affecting esophageal motility, markedly diminished the resting pressure of the inferior sphincter. Sympathectomy, performed before vagotomy, prevented the effect of vagotomy on the sphincter but not on the body of the esophagus. Loss of ganglion cells in Auerbach's plexus was not seen after any of these procedures.

0268 A PHARMACOLOGIC AID IN THE RADIOGRAPHIC DIAGNOSIS OF OBSTRUCTIVE ESOPHAGEAL LESIONS. *(E.)* Ghahremani, G.G., Heck, L.L.; Williams, J.R. (Pritzker Sch. of Med., Univ. of Chicago, Ill.). *Radiology* 103(2):289-293, 1972.

The value of propantheline bromide (Pro-Banthine) as a diagnostic aid was studied in 14 cases of esophageal obstruction. Three cases of progressive dysphagia with narrowing of the esophagus are described in detail. Spasm may interfere with radiologic diagnosis of the disease or the extent of involvement. Due to its anticholinergic and spasmolytic effects, Pro-Banthine administered during examination will localize the stricture, allow better visualization of the mucosal pattern, and permit demonstration of the otherwise unseen distal portion of the esophagus. As a palliative measure, Pro-Banthine may allow the patient to resume liquid diet or at least decrease discomfort by its antisecretory effect on the salivary glands. Obstruction in six of the cases was found to be due to carinoma, achalasia in 6, and benign stricture in 2.

0269 ESOPHAGUS IN PROGRESSIVE SYSTEMIC SCLEROSIS; CLINICAL, RADIOLOGICAL AND MANOMETRIC CORRELATIONS. *(Sp.)* Uribe, P.; Csendes, A.; Larrain, A. (Hosp. Jose J. Aguirre, Univ. Chile, Santiago). *Rev. Esp. Enferm. Apar. Dig.* 4(1):15-19, 1972.

Clinical, radiological, and manometric studies of 41 patients with systemic scleroderma are reported. The radiological studies were made with a standard barium meal and esophageal motility was measured with open-tipped catheters using constant infusion. The findings were compared with those for a control group without esophageal symptoms such as heartburn and dysphagia. Dysphagia was seen in 75% of the patients. Twenty percent had a normal radiological study while in the rest the esophagus appeared dilated and hypotonic. Other findings were stenosis of the lower third of the esophagus and small hiatal hernias. No gastroesophageal sphincter was detectable in 75% of the patients by manometry. Both mean resting pressure and amplitude of esophageal contraction waves were significantly lower than in controls. Aperistalsis of the esophagus was frequently seen in the lower half. The motility measurements indicated that esophageal deterioration appeared before clinical manifestations of scleroderma.

0270 THE POSSIBILITY OF ERRORS IN THE DIAGNOSIS OF CAUSES OF UPPER DIGESTIVE TRACT HAEMORRHAGES. *(Pol.)* Fryczkowski, M. (Miners' Hosp. Zabrze-Biskupice, Poland). *Pol. Tyg. Lek.* 27(15): 567-568, 1972.

0271 RESTORATION OF CARDIOESOPHAGEAL COMPETENCE. *(E.)* Thomas, T. V. (Veterans Admin. Hosp., Kansas City, Mo.). *Postgrad. Med.* 51(3):171-175, 1972.

0272 ANOTHER ESOPHAGEAL RUPTURE AFTER ALCOHOL AND DISULFIRAM. *(E.)* Fernandez, D. (U.S. Coast Guard Acad. Hosp., New London, Conn.). *N. Engl. J. Med.* 286(11):610, 1972.

0273 PHARYNGO-ESOPHAGEAL DIVERTICULUM. *(Por.)* Branco Ribeiro, E. (Sanatorio Sao Lucas, Brazil). *An. Paul. Med. Chir.* 98(2):85-117, 1971.

0274 A NEW METHOD TO EVACUATE AN ACHALASIC OESOPHAGUS. *(Fr.)* Grigorescu, A. (Clin. Chir. "C. Davila". Bucarest, Rumania). *Acta Gastroenterol. Belg.* 35(1-2):56-58, 1972.

0275 "CARDIOSPASM" IN ACHALASIA; EVIDENCE OF HYPERSENSIBILITY OF THE INFERIOR ESOPHAGEAL SPHINCTER. *(Sp.)* Guelrud, M.; Cohen, B. (Mt. Sinai Hosp., New York, N.Y.). *Acta Gastroenterol. Latinoamer.* 4(1):1-7, 1972.

0276 GASTRIC VOLVULUS AND OBSTRUCTION IN PARA-ESOPHAGEAL HIATUS HERNIA. *(E.)* Babb, R. R.; Peck, O. C.; Jamplis, R. W. (Palo Alto Med. Clin., Palo Alto, Calif.). *Am. J. Dig. Dis.* 17(2):119-28, 1972.

0277 TRAUMATIC PERFORATION OF OESOPHAGUS. *(E.)* Anonymous. *Br. Med. J.* 1(5799):524-525, 1972.

0278 THE SURGICAL PROBLEM CONCERNING RECURRENCE OF MALIGNANT DISEASE IN THE LOWER THIRD OF THE OESOPHAGUS IN PATIENTS HAVING UNDERGONE GASTRECTOMY FOR TREATMENT OF MALIGNANT TUMOURS. *(E.)* Markovits, S. (Zonal Gen. Hosp. St. Maria delle Stelle, Melzo, Italy). *Chir. Gastroenterol.* 6(1):14-23, 1972.

0279 CARCINOMA OF THE OESOPHAGUS AFTER GASTRIC SURGERY. *(E.)* Stalsberg, H. (Ulleval Hosp., Oslo, Norway). *Lancet* (7746):381, 1972.

0280 ACHALASIA WITH NORMAL FUNCTION OF THE CARDIOESOPHAGEAL SPHINCTER. *(E.)* Monto, G. L.; Westmore, J. B.; Paustian, F. F. (Dept. Intern. Med., Gastroenterol. Sect., Univ. Nebraska, Omaha). *Rend. Gastroenterol.* 4(1):31-34, 1972.

0281 ACUTE MONILIAL ESOPHAGITIS OCCURRING WITHOUT UNDERLYING DISEASE IN A YOUNG MALE. *(E.)* Brown, J. W.; McKee, W. M. (Wenatchee Valley Clinic, P. O. Box 489, Wenatchee, Wash. 98801). *Am. J. Dig. Dis.* 17(1):85-88, 1972.

0282 ACHALASIA OESOPHAGI. RESULTS OF THE HELLER OPERATION. *(E.)* Akuamoa, G.

(Surg. Dept. D., Rigshopitalet, Copenhagen, Denmark).
Acta Chir. Scand. 137(8):782-788, 1971.

0283 RESECTION OF OESOPHAGUS IN THE TREATMENT
OF BLEEDING OESOPHAGEAL VARICES. *(E.)*
Bergentz, S. E.; Lindgren, S. (Dept. Surg., Univ.
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Lilly, J. O.; McCaffery, T. D. (Dept.
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0285 TREATMENT OF FIBROUS STRICTURE OF THE
ESOPHAGUS SECONDARY TO REFLUX ESOPHAGITIS.
(E.) Raia, A. A.; Aquarone, D.; Gama Rodrigues,
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0286 OUR EXPERIENCE OF ESOPHAGOPLASTY. *(E.)*
Forster, E.; Adloff, M.; Nouzha, E.;
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(E.) Benedetti Valentini, S. (Arcispedale
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0288 HIATUS HERNIA AS A CAUSE OF BLEEDING FROM
UPPER DIGESTIVE TRACT. *(Pol.)* Rudowski,
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289 ESOPHAGEAL LEIOMYOMA. *(Sp.)* Santamaria
Garcia, J. L.; Lopez-Rios, F.; Miguel
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(Ciudad Sanit. Seguridad Social LaPaz, Madrid,
evilla, Spain). *Rev. Esp. Enferm. Apar. Dig.*
6(6):631-654, 1972.

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EO - GASTRODUODENAL DISEASES. *(Sp.)* Martinez
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evilla, Spain). *Rev. Esp. Enfrem. Apar. Dig.* 36(6):
35-752, 1972.

291 PALLIATIVE RADIATION TREATMENT OF ESOPHA-
GEAL CANCER. REVIEW OF 54 CASES. *(Sp.)*
opez-Calderon Barreda, M. (Hosp. Clin. San Carlos,
adrid, Spain). *Rev. Esp. Enferm. Apar. Dig.*
7(1):57-70, 1972.

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SJOEGREN'S SYNDROME. *(E.)* Pinto de Moraes
ilho, J.; Borini, P.; Cossermelli, W.; Betarello, A.
Med. Sch. Sao Paulo, Brazil). *Acta Gastroenterol.
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293 NISSEN'S APPROACH IN THE TREATMENT OF
ESOPHAGEAL HIATUS HERNIA. AN EXPERIMENTAL
STUDY ON HISTOLOGIC REPAIR OF FUNDOPLICATION. *(Sp.)*
Pera, C.; Leon, J.; Sanchez-Lloret, J.; Morano, J.;
Vila, J. (Univ. de Barcelona, Spain). *Rev. Esp.
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0294 ESOPHAGEAL DILATATION IN ADVANCED
ACHALAŞIA. *(E.)* Langdon, D. E. (Wilford
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Texas). *Am. J. Dig. Dis.* 17(7):669, 1972.

0295 THE MANAGEMENT OF ESOPHAGEAL COMPLICATIONS
OF EPIDERMOLYSIS BULLOSA. *(E.)* Schuman,
B. M.; Arciniegas, E. (Henry Ford Hosp., Detroit,
Mich.). *Am. J. Dig. Dis.* 17(10):875-880, 1972.

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Hosp., Darlington, Co. Durham). *Br. J. Clin.
Pract.* 26(4):167-169, 1972.

0297 THE PORTACAVAL ANASTOMOSIS AS EMERGENCY
OPERATION DURING MASSIVE HEMORRHAGE FROM
ESOPHAGEAL VARICES. *(E.)* Haring, R.; John, S.;
Kourias, E.; De Pena Perez, R.; Stallkamp, B.;
Tung, L. C.; Waldschmidt, J. (Dept. Surg., Klinikum
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Poitreau, C. (Ctr. Hop. U. Angers,
Angers, France). *Concours Med.* 94(16):3026-3032,
1972.

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(Rus.) Voronov, A. A.; Blinova, O. A.;
Sheyko, V. Z. (Leningrad Inst. Postgrad. Med.,
Leningrad, U.S.S.R.). *Grudn. Khir.* 14(2):104-109,
1972.

0301 INTRATHORACIC ANASTOMOSES IN ESOPHAGEAL
STENOSIS. *(Rus.)* Rogacheva, V. S.; Fomin,
P. D. (Tomsk Med. Inst., Tomsk, USSR). *Grudn.
Khir.* 14(2):114-118, 1972.

0302 APPLICATION OF INNER PROSTHETIC TUBES IN
INOPERABLE CARCINOMA OF THE ESOPHAGUS.
(Ger.) Matijasic, I.; Murr, G.; Pesek, A.; Stojic,
M. (Med. Ctr. Pola, Yugoslavia). *Hals-Nasen-Ohren-
Heilk.* 20(5):148-150, 1972.

0303 MALIGNANT DEGENERATION OF PEPTIC ESOPHAGI-
TIS. *(Fr.)* Ribet, M.; Mortier, F. (Clin.

Chir. Ouest, Lille, France). *J. Chir. (Paris)* 103(4):341-352, 1972.

0304 ZENKER'S DIVERTICULUM: IMPORTANCE OF THE PHARYNGO-ESOPHAGEAL SPHINCTER. *(Fr.)* Ribet, M.; Latreille, J.-P.; Remy, J. (Clin. Chir. Duest, Lille, France). *J. Chir. (Paris)* 104(1-2):-37-54, 1972.

0305 SPONTANEOUS PERFORATION OF THE ESOPHAGUS IN A NEWBORN BABY. *(Fr.)* Desorgher, G.; Bayart, M.; Fournier, A.; Cousin, J.; Huguet, J. (Fac. Libre Med. Lille, France). *J. Sci. Med. Lille* 90(5):207-209, 1972.

0306 CANCER OF THE OESOPHAGUS AND ALCOHOLIC DRINKS IN EAST AFRICA. *(E.)* Cook, P.; Collis, C. H. (M.R.C. Statistical Res. and Service Unit, London WCIE 6AS). *Lancet* (7758):1014, 1972.

0307 EXSANGUINATING BLEED FROM ESOPHAGEAL VARICES-AN UNORTHODOX SURGICAL APPROACH. *(E.)* Wise, L. (Washington Univ. Sch. Med. St. Louis, Mo.). *Missouri Med.* 69(5):361-363, 1972.

0308 X-RADIATION THERAPY APPLIED TO THE CANCER OF THE ESOPHAGUS AT THE GLIWICE INSTITUTE OF ONCOLOGY DURING THE 1947-1962 PERIOD. *(Pol.)* Wieckowska, Z. (Inst. Oncol. Gliwice, Poland). *Pol. Przegl. Radiol.* 36(3):371-375, 1972.

0309 ACCIDENTAL PERFORATION OF THE ESOPHAGUS. *(Por.)* Goldenberg, S.; De Oliveira, E.; Figueira, A.; Herani, B. Jr. (Esc. Paul. De Med., Sao Paulo, Brazil). *Rev. Ass. Med. Brasil* 18(3):103-108, 1972.

0310 CONGENITAL ESOPHAGEAL ATRESIA: MERCURY BAG STRETCHING OF THE UPPER POUCH IN A PATIENT WITHOUT TRACHEOESOPHAGEAL FISTULA. *(E.)* Thomasson, B. H. (Dept. Pediat., Univ. Turku, Finland). *Surgery* 71(5):661-663, 1972.

See also 0048, 0049, 0197, 0199, 0252, 0253, 0259, 0292, 0481, 0847

STOMACH

0311 EFFECTS OF ETHANOL ON THE CELL PROLIFERATION KINETICS IN THE FUNDIC MUCOSA OF DOGS. *(E.)* Willems, G.; Vansteenkiste, Y.; Smets, P. H. (Dept. of Surgery, Univ. of Brussels, Belgium). *Am. J. Dig. Dis.* 16(12):1057-1063, 1971.

Following instillation of alcohol into the stomachs of dogs, a sequential analysis of the proliferative parameters in the fundic mucosa was performed. Mucosal specimens obtained at 4-hour intervals through a gastric cannula were incubated with tritiated thymidine and subjected to autoradiography. After ethanol, significant variations were observed in the labeling index, mitotic index and in foveolar height. Foveolar height was abruptly reduced at the fourth hour. The labeling index was increased between the eighth and the twentieth hour, whereas a mitotic peak appeared between the twentieth and the twenty-fourth hour and, quite simultaneously, the mucosal pattern was restored to normal. This demonstrates that when alcohol is instilled into the stomach, a burst of proliferative activity occurs, which might be related to regenerative process.

0312 *IN VITRO* DEMONSTRATION OF DELAYED HYPERSENSITIVITY TO GASTRIC ANTIGENS IN PERNICIOUS ANEMIA. *(E.)* Finlayson, N.D.C.; Fauconnet, M.H.; Krohn, K. (Cornell Univ. Med. Center, New York, N.Y.). *Am. J. Dig. Dis.* 17(7):631-638, 1972.

As an indication of the presence of abnormal delayed hypersensitivity, migration inhibition of peripheral leukocytes in the presence of various human gastric antigens was sought in 12 patients with pernicious anemia and 8 healthy controls. Gastric juice antigens caused migration inhibition in 9 of 12 patients with pernicious anemia at doses which did not cause migration inhibition in control subjects. Fractionation of the gastric juice showed that the antigens causing migration inhibition were in both the vitamin B_{12} binding and the non-vitamin B_{12} binding fractions. Where the vitamin B_{12} binding fraction had been saturated with vitamin B_{12}, migration inhibition was still seen. There was no relation between the presence of parietal cell or intrinsic factor antibodies and migration inhibition in response to gastric juice antigens. This work confirms that abnormal delayed hypersensitivity occurs in pernicious anemia and, in addition, suggests that several antigens may be involved in these reactions.

0313 PATHOGENESIS OF OSTEOMALACIA IN SECONDARY HYPERPARATHYROIDISM AFTER GASTRECTOMY. *(E.)* Wortsman, J.; Pak, C. Y. C.; Bartter, F. C.; Deftos, L.; Delea, C. S. (Nat. Heart and Lung Inst., NIH, Bethesda, Md.). *Am. J. Med.* 52(4):556-564, 1972.

A 37-year-old man developed osteomalacia five years after subtotal gastrectomy. Gastrointestinal loss of calcium was excessive, endogenous fecal calcium secretion was high, and urinary calcium excretion was low. Circulating parathyroid hormone was present in excess and could be readily decreased by the infusion of calcium or with dihydrotachysterol; with both measures the serum phosphate level returned to normal. It is suggested that a primary defect in calcium absorption led, via a stimulus to the parathyroids, to hyperphosphaturia, hypophosphatemia and osteomalacia; whereas calcium absorption became almost normal, gastrointestinal hypersecretion of calcium continued.

314 A PROPOSED METHOD TO INTERRUPT GASTROINTESTINAL BLEEDING: PRELIMINARY REPORT. *(E.)* eVeen, H.H., Diaz, C.; Falk, G.; Piccone, V.; arnoz, M.; Wynkoop, B.; Nelson, J.; Pedowitz, W.; elfasky, R.B.; Borek, B. (VA Hosp., and Downstate ed. Cen., Brooklyn, N.Y.). *Ann. Surg.* 175(4):459-65, 1972.

he control of gastrointestinal bleeding by use of evarterenol was investigated in dogs and humans. n animal experiments, 15 of 17 animals bled to eath after surgical excision of a mucosal path. hen levarterenol was substituted intragastrically or saline, six of eight animals survived, and with he intraperitoneal use of levarterenol, eight of ine animals survived. In 12 of 18 patients with evere upper gastrointestinal bleeding, intraeritoneal and/or intragastric levarterenol in high oncentrations arrested the bleeding or rendered it nsignificant. Levarterenol injected directly into he portal vein was rapidly metabolized by the liver. hen used for short intervals and with suction to emove excess levarterenol intraperitoneal or intraastric admonistration of levarterenol did not licit hypertension or damage the bowel.

315 STUDIES OF GASTRIC SECRETIONS IN STRESSED PATIENTS. *(E.)* Robbins, R., Idjadi, F.; tahl, W.M.; Essiet, G. (New York Univ. Med. Center, ew York, N.Y.). *Ann. Surg.* 175(4):555-562, 1972.

astric acidity, pepsin concentration, and concenration of several mucus fractions were serially easured in 36 patierts undergoing severe stress nd in 19 normal subjects. Twenty of the 36 patients howed some degree of gastrointestinal bleeding. cid levels were high in all stressed patients and ere higher in those who bled. Mucus concentrations n the stressed group were lower than normal resting evels. Stressed bleeders had significantly higher exose/hexosamine ratios, and lower fucose levels, han other stressed patients.

16 STUDIES ON THE PATHOGENESIS OF BENIGN GASTRIC ULCER: INCREASED BACK DIFFUSION OF DROGEN ION IN EXPERIMENTAL ATROPHIC GASTRITIS. *(E).* Ritchie, W.P.,Jr.; Butler. B.A.; Delaney, J.P. (Univ. of Minnesota Health Sci. Center, Minneapolis). *Ann. Surg.* 175(4):594-600, 1972.

The back diffusion of hydrogen ion in atrophic gastric mucosa was studied by interposing five vagally denervated canine fundic pouches into the primal jejunum. Five to seven months later, the mucosa of each pouch demonstrated areas of round cell infiltration, disappearance of parietal and chief cells, glandular cystification, and atrophic gastritis. At this time each pouch was cannulated and injected with a solution containing hydrochloric acid, sodium chloride, and trace amounts of ^{24}Na. Thirty min later, the pouch was emptied, its acid secretory response to histamine acid phosphate determined, the mucosal area of the pouch measured, and the muscosa examined histologically. Hydrogen ion, postassium, water, and sodium fluxes were calculated. Compared with normal canine pouches drained internally by a Roux-en-Y limb of jejunum, the gastric pouches demonstrated significantly greater net water and hydrogen ion out-flux, significantly greater net influx of potassium, significantly greater bidirectional sodium fluxes, and significantly decresed acid output. The observed alterations were a function of the altered histology. These findings may explain, at least in part, the apparent hyposecretion of gastric acid in gastric ulcer patients and the increased susceptibility of atrophic mucosa to acid peptic digestion.

0317 EROSIVE GASTRITIS: ITS DIAGNOSIS, MANAGEMENT, AND SURGICAL TREATMENT. *(E.)* Desmond, A. M.; Reynolds, K. W. (St. James's Hospital, Balham, London, England). *Br. J. Surg.* 59(1):5-13, 1972.

The problems of diagnosis and management in 331 patients with severe hemorrhage resulting from erosive gastritis, representing 10 per cent of 3938 patients admitted with severe gastroduodenal bleeding during the past 30 years, are discussed. The role of immediate gastroscopy, and the indications for surgical treatment and the surgical procedure best designed to control the hemorrhage are examined in detail. In 47 patients, 51 emergency surgical procedures were required, and it was found that the Billroth-I gastrectomy was far superior to any other operation. Polya gastrectomy, vagotomy, and gastric vasoligation were used, with a high incidence of recurrent bleeding and often necessitating a further emergency surgical operation-usually total gastrectomy. It is suggested that a possible explanation of this is the prevention of biliary reflux into the stomach, which is what the Billroth-I gastrectomy seems to achieve. In 1 case presented, a patient with a Polya gastrectomy and erosions who had severe hemorrhage, bleeding was controlled by conversion to a Billroth-I anastomosis.

0318 CLINICAL FEATURES AND HISTOGENESIS OF NEUROGENIC TUMORS OF THE UPPER GASTROINTESTINAL TRACT. *(Ger.)* Pross, E.; Hill, K.; Schmitt-

Koeppler, A. (Chirurgische Universitaetsklin., Mainz, Germany). *Deut. Med. Wochenschr.* 97(23):899-902, 1972.

Fourteen cases of neurogenic tumor of the stomach, and seven cases in the upper gastrointestinal tract were found during a five-year period. There were 14 neurilemmomas, one neurofibroma, and six malignant schwannomas. Anemia and hemorrhage may be the cardinal signs in all forms of neurogenic tumor. The most useful diagnostic procedures include radiologic examination ("wandering ulcer" or a smooth, spherical tumor with navel-like indentation) and endoscopy with selective biopsy. The finding of a neurogenic tumor is an absolute indication for surgery; the extent of the surgery depends on the position, size, and biological activity of the tumor.

0319 THE EFFECT OF SEVERAL ULCEROGENIC DRUGS ON THE CANINE GASTRIC MUCOSAL BARRIER. *(E.)*

Chvasta, T. E.; Cooke, A. R. (VA Hosp. Iowa City, Ia. 52240). *J. Lab. Clin. Med.* 79(2):302-315, 1972.

The effect of acetylsalicylic acid, indomethacin, phenylbutazone, caffeine, and hydrocortisone, cortisone, and cortisone acetate was studied on the gastric mucosal barrier to ion diffusion in denervated (Heidenhain) pouches of the oxyntic glandular mucosa of 4 healthy dogs. A solution consisting of HCl (100 mM), NaCl (54 mM), and phenol red (40 mg/l) was instilled into the pouch for consecutive 30-min periods. The transmucosal fluxes of H^+, Na^+, K^+, and Cl^- and the transmucosal potential difference were simultaneously determined. Acetylsalicylic acid (20 mM) instilled into the pouch at a pH of 1.0 caused an abrupt, significant net movement of Na^+ ($p < 0.05$) into the lumen, a significant net movement of H^+ ($p < 0.05$) out of the lumen, a significant net movement of Cl^- ($p < 0.05$) into the lumen, and a significant decrease of the potential difference ($p < 0.001$). Indomethacin (250 mg per 100 ml) instilled into the pouch at either pH 1.0 or pH 7.3 caused changes similar to those of acetylsalicylic acid (pH 1.0). Gross mucosal bleeding was noted in all of the studies with acetylsalicylic acid and in 25% of the studies with indomethacin. Caffeine at a pH of 1.0 and pH 7.3, phenylbutazone, hydrocortisone, cortisone, and cortisone acetate at a pH of 1.0 were found to have no significant effect on the transmucosal net fluxes of H^+, Na^+, K^+, and Cl^- or on the potential difference. The transmucosal potential difference was found to be a reproducible and sensitive measure of the integrity of the canine gastric mucosal barrier. An exponential correlation was found between the mean potential difference and the transmucosal net flux of either H^+ of Na^+ for each dog studied.

0320 SERUM GASTRIN LEVELS BEFORE AND AFTER VAGOTOMY AND PYLOROPLASTY OR VAGOTOMY AND ANTRECTOMY.

(E.) McGuigan, J.E.; Trudeau, W.L. (Univ. Florida Coll. Med., Gainsville). *N. Engl. J. Med.* 286(2):184-188, 1972.

In 28 patients with duodenal ulcer, fasting serum gastrin concentrations and rates of basal and maximum gastric acid secretion were measured before and at least six months after either antrectomy with vagotomy or pyloroplasty with vagotomy. The mean serum gastrin level after antrectomy and vagotomy was substantially and significantly reduced. This decrease was accompanied by more than 90 per cent reduction in both basal and stimulated acid secretion. In contrast, no fall in fasting serum gastrin concentrations was observed after pyloroplasty with vagotomy. These results indicate that reductions in gastric acid secretion after vagal transection, with pyloroplasty, cannot be interpreted as consequences of reductions in vagally stimulated gastrin release. More probable mechanisms include modification of the sensitivity of the parietal-cell mass to gastrin or interruption of more direct vagal effects on acid-secreting cells.

0321 PLASMA GLUCAGON AND INSULIN RESPONSES TO VARIOUS SUGARS IN GASTRETOMIZED AND NORMAL SUBJECTS.

(E.) Shima, K.; Duroda, K.; Matsuyama, T.; Tarui, S.; Nishikawa, M. (Osaka Univ. Med. Sch., Fukushima-ku, Osaka, Japan). *Proc. Soc. Exp. Biol. Med.* 139(3):1042-1048, 1972.

Plasma immunoreactive glucagon (IRG) and immunoreactive insuline (IRI) were measured in 21 gastrectomized and 11 normal subjects. Plasma IRG and IRI responses to oral glucose, galactose, and fructose and to intravenous glucose were also investigated in some subjects. Fasting IRG levels were similar in both groups, but 30 min after ingestion of 100 g glucose, plasma IRG concentration of gastrectomized subjects was significantly higher than that of controls. Oral glucose caused hyperglucagonemia and a marked rise in plasma IRI, while intravenous glucose caused only a moderate increase in plasma IRI and no change in IRG concentration. Plasma IRG levels were significantly higher in gastrectomized subjects compared with controls after oral galactose and fructose. Of the three sugars tested orally, glucose was the most potent stimulus for plasma IRG and fructose the weakest stimulus. The results suggest that glucagon, probably of gastrointestinal origin, is released in response to chemical as well as mechanical or osmotic stimuli.

0322 INDICANURIA AFTER GASTRIC SURGERY. AN EVALUATION IN THE DIAGNOSIS OF THE BLIND-LOOP SYNDROME.

(E.) Tomkin, G.H., Weir, D.G. (Dept. of Int. Med., Univ. of Cincinnati, Ohio). *J. Med. New Ser.* 41(162):191-203, 1972.

The level of indican excreted in the urine per 24 hours has been measured in 127 subjects following surgery (18 Billroth 1 type partial gastrectomies, 63 Polya type partial gastrectomies, and 46 gastroenterostomies), and compared with 141 normal control subjects. In the control group the dietary tryptophane intake correlated directly with the level of indicanuria, which may account for the wide variation in normal values. The dietary intake of tryptophane was significantly lower in the postgastric-surgery subjects than in the matched controls. This may be a factor in the severe protein depletion reported following partial gastrectomy. Twenty-nine (23 per cent) of our post-gastric-surgery group had elevated indican levels; all had had either Polya partial gastrectomy, or gastro-enterostomy, both of which entail the creation of a 'blind' loop liable to bacterial colonization. By contrast there was no difference between the Billroth 1 subjects and the control group. The level of indicanuria and the *E. coli* population of the small intestine were shown to be related in 10 patients following gastric surgery. Fecal-fat excretion in 18 subjects was significantly related to indican excretion; and post-operative weight loss was related to the levels of indicanuria in the whole group. Bacterial colonization of the afferent loop following Polya gastrectomies and gastro-enterostomies is apparently under-estimated as a cause of steatorrhea and post-operative weight loss. No relationship was found between indican excretion and serum vitamin B_{12} serum iron, or the degree of post-operative anemia. The level of indican excreted in the urine following gastric operations is proportional to the degree of bacterial colonization of the upper small intestine. It may therefore indicate when further metabolic complications are to be expected.

0323 TRIAL OF ASSESSEMENT OF ADRENOCORTICAL FUNCTIONS BY DETERMINATION OF URINARY 17-HYDROXY-CORTICOSTEROID EXCRETION IN PATIENTS GASTRECTOMIZED FOR PEPTIC ULCER. *(Pol.)* Lubczynska-Kowalska, W. (Acad. Med. Wroclaw, Poland). *Pol. Tyg. Lek.* 26(39): 496-1498, 1971.

0324 INTRA-MUCOUS GASTRIC CANCER. AN OBSERVATION IN A 25-YEAR-OLD WOMAN. *(Fr.)* Gutmann, R. A.; Schops, T.; Hamel de Montchenault, H.; Eilbaum, M. *Nouv. Presse Med.* 1(22):1505-1506, 1972.

0325 CARCINOID TUMOR OF THE STOMACH. *(Dan.)* Prahl, P. (Centralsygehuset, Naestved, Den- ark). *Ugeskr. Laeger* 133(39):1932-1934, 1971.

0326 SUBTOTAL GASTRECTOMY WITH ANASTOMOSIS TO THE SECOND PART OF THE DUODENUM. BASED N 64 CASES. *(Fr.)* Lataste, J.; Cossa, J. F.; Cha- aneix, G. (Cent. Hosp. Intercommunal, Paris, France). *ouv. Presse Med.* 1(11):723-726, 1972.

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328 CARCINOMA OF THE STOMACH. *(E.)* Inberg, M. V.; Vuori, J.; Viikari, S. J. (Dept. urg., Univ. Turku, Finland). *Acta Chir. Scand.* 38(2):195-201, 1972.

0329 ASSOCIATION OF GASTRIC CARCINOMA WITH IDIOPATHIC LATE ONSET IMMUNOGLOBULIN DEFICIENCY. *(E.)* Hermans, P. E.; Huizenga, K. A. (Mayo Clinic and Mayo Found., Rochester, Minn.). *Ann. Intern. Med.* 76(4):605-609, 1972.

0330 GASTROINTESTINAL SUTURE LINE DISRUPTION FOLLOWING GASTRECTOMY FOR MALIGNANT TUMOR. *(E.)* Ghosh, B. C.; Goldsmith, H. S. (Mem. Sloan-Kettering Cancer Center, New York, N. Y.). *Ann. Surg.* 175(3):436-438, 1972.

0331 THE REVERSIBILITY OF POSTGASTRECTOMY ALKALINE REFLUX GASTRITIS BY AN ROUX-EN-Y LOOP. *(E.)* Lawson, H. H. (Dept. Surg., Univ. Witwatersrand and Baragwanath Hosp., Johannesburg, S. Afr.). *Br. J. Surg.* 59(1):13-15, 1972.

0332 BONE DISEASE AFTER GASTRECTOMY. *(E.)* Anonymous. *Br. Med. J.* 1(5798):461, 1972.

0333 POST-VAGOTOMY GASTRIC DILATION. *(E.)* Chacon, J. P.; Whitaker, J. C. C.; Camporini, S. (Escola Paulista de Medicina Sao Paulo, Brazil). *Chir. Gastroenterol.* 6(2):111-121, 1972.

0334 AN ANALYSIS OF THE GASTRIC STASIS INDUCED BY PYROGEN: THE EFFECTS ON INTRINSIC AND EXTRINSIC MOVEMENTS OF THE RUMINANT FORESTOMACH. *(E.)* Leek, B. F.; van Miert, A. S. J. P. A. M. (Dept. Vet. Physiol., Univ. Edinburgh, Scotland). *Rend. Gastroenterol.* 3:163-167, 1971.

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0336 VEGETATIVE INNERVATION OF THE STOMACH AFTER VAGOTOMY. *(E.)* Perrino, G.; Lise, M.; Cordioli, G. P. (Dept. Clin. Surg., Univ. Padova, Italy). *Chir. Gastroenterol.* 5(4):458-465, 1971.

0337 A CASE OF PEDUNCULATED GASTRIC POLYP. *(Pol.)* Stepien, M.; Przepiorski, J. *Pol. Tyg. Lek.* 26(52):2028-2029, 1972.

0338 EARLY DIAGNOSIS OF THE ZOLLINGER-ELLISON SYNDROME. *(E.)* Passaro, E., Jr.; Basso, N. (UCLA Sch. Med., Dept. Surg., Los Angeles, and Surg. Clin. II of the Univ., Rome). *Rend. Gastroenterol.* 3:155-158, 1971.

0339 THE "BENIGN" OR "MALIGNANT" PROBLEM OF GASTRIC NICHES. *(Sp.)* Ferrando, J.; Nogues, E.; Bort, J.; Berenguer, J. (Fac. Med. Valencia, Spain). *Rev. Esp. Enferm. Apar. Dig.* 36(4):423-440, 1972.

0340 GASTRIC AND DUODENAL LIPOMAS. WITH REFERENCE TO 2 CASES. *(Sp.)* Garrido, G.; Perez Carrillo, A.; Berenguer, J.; Rodrigo, M.; Baguena, J.; Tamarit, L. (Ciudad Sanit. S. S. "La Fe", Valencia, Spain). *Rev. Esp. Enferm. Apar.* 37(1):71-78, 1972.

0341 ACUTE GASTRITIS FROM A MAXIMUM HISTAMINE TEST. *(Sp.)* Salvioli, J. E.; Castelleto, R.; Giacomantone, O. (Fac. Cienc. Med. La Plata, Argentina). *Rev. Esp. Enferm. Apar. Dig.* 37(4): 459-466, 1972.

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0343 ELEVATED LYMPHOCYTE ADENOSINE TRIPHOSPHATASE ACTIVITY IN PATIENTS WITH GASTROINTESTINAL CARCINOMA. *(E.)* Dimitrov, N. V.; Ellegaard, J. (Hahnemann Med. Coll., Philadelphia). *N. Engl. J. Med.* 286(7):353-355, 1972.

0344 STRESS-INDUCED ULCERS. *(Sp.)* Martinez Rodriguez, E. (Ciudad Sanit. Nuestra Senora de Covadonga, Ovieda, Spain). *Rev. Esp. Enferm. Apar. Dig.* 37(2):201-210, 1972.

0345 GASTRIC EMPTYING IN PEPTIC ULCER PATIENTS BEFORE AND AFTER PARTIAL GASTRECTOMY AND SELECTIVE PROXIMAL VAGOTOMY. *(E.)* Moberg, S.; Carlberger, G.; Barany, F.; Lundh, G. (St. Eriks Hosp., Stockholm, Sweden). *Rend. Gastroenterol.* 4:1-7, 1972.

0346 ABERRANT PANCREAS AND DUODENAL DIVERTICULUM. *(Sp.)* de la Fuente Gomez, L.; Bustamante Bustamante, J.; Naveira, C.; de la Gandara y Ortega Morales, F. (Dept. Med. Pathol. A, Valladolid, Spain) *Rev. Esp. Enferm. Apar. Dig.* 36(5):559-566, 1972.

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0348 COMPARATIVE GASTROSCOPIC STUDY OF CHOLINE SALICYLATE AND ASPIRIN. *(E.)* Danao, S. C.; Schuman, B. M. *Henry Ford Hosp. Med. J.* 20(1):27-32, 1972.

0349 CHRONIC GASTRIC EROSIONS AND ORAL APHTHAE. *(E.)* O'Brien, T. K.; Saunders, D. R.; Templeton, F. E. (Div. Gastroenterol., Univ. Washington Sch. Med. Seattle, Wash.). *Am. J. Dig. Dis.* 17(5):447-454, 1972.

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0351 SULFATED MUCO-SUBSTANCES AND GASTRIC DISEASES. *(E.)* Lambert, R.; Andre, C. (Hop. Edouard Herriot, Lyon, France). *Digestion* 5:116-122, 1972.

0352 THE PRINCIPAL GUIDING CRITERIA IN THE DIAGNOSIS OF THE VARIOUS STAGES OF CHRONIC GASTRITIS. *(It.)* Bigotti, A.; Crespi, M.; Di Matteo, S. (Ist. Regina Elena Stud. Cura Tumori, Roma, Italy). *Rass. Clin. Sci.* 48(2):63-64, 1972.

0353 A CASE OF TUBERCULOUS GASTRITIS. *(Fr.)* Malchair, G.; Heches, P.; Maydat, J.; Chatelan, J.-L. (no affil.). *Bull. Soc. Med. Afr. Noire Lang. Fr.* 16(4):523-526, 1971.

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0355 VARIOLIFORM GASTRITIS AS A POSSIBLE CAUSE OF MELENA. *(It.)* DiCaro, A., Spagliardi, E. (Osped. Civili, Genova, Italy). *Rass. Clin. Sci.* 48(3):94-96, 1972.

0356 GASTRIC DIVERTICULOSIS. *(Sp.)* Meeroff, M.; Meeroff, J.C.; Maciel Gollan, J.R. (Sanat. Metrop., Buenos Aires, Argentina). *Gastroenterol. Endocrinol. Nutr.* 26(1):13-28, 1971.

0357 CEREBRAL EMBOLISM IN CASE OF AN OCCULT CARCINOMA OF THE STOMACH AND PARA-NEOPLASTIC ENDOCARDITIS. *(Cz.)* Messerschmidt, I.; Kubancok, J.; Zuffa, M. (Liptovsky Mikulas Hosp. Czechoslovakia). *Cesk. Neurol.* 68(4):213-216, 1972.

0358 THE EFFECT OF SURGICAL TRAUMA AND ENDOTRACHEAL NARCOSIS ON THE COURSE AND OUTCOME OF ESOPHAGEAL AND GASTRIC SURGERY UNDER VARIOUS CONDITIONS OF THE REFLEXOGENIC ZONES. *(Rus.)* Rusakov, V.I.; Sulimov, Ye.P.; Sulimova, G.I. (Rostov Med. Inst., Rostov, USSR). *Vestn. Khir. Grekov* 103(1):64-69, 1972.

0359 INTRAMUCOSAL GASTRIC CANCER. CASE REPORT ON A 35 YEAR OLD WOMAN. *(Fr.)* Gutmann, R. A.; Schops, T.; Hamel de Montchenault, H.; Eilbaum, M. (no affil.). *Nouv. Presse Med.* 1(22): 1505-1506, 1972.

0360 A NEW ANALGESIC FOR PATIENTS WITH A GASTRIC MUCOSA, WEAKENED BY ULCER OR OTHER DIGESTIVE SYNDROMES IN THEIR HISTORY. *(Fr.)* Cachin, M.; Levy, Cl. (Hop. Cochin, Paris, France). *Therapeutique* 48(5-6):375-380, 1972.

0361 A CASE OF GASTRIC POLYPOSIS. *(Pol.)* Stasiewicz, J., Gabryelewicz, A.; Prokopczuk, J.; Popow, J.; Stasikiewicz-Chmielewska, B. (Inst. Int. Dis. Bialystok Acad. Med., Bialystok, Poland). *Wiad. Lek.* 25(14):1255-1259, 1972.

0362 USEFULNESS OF ESOPHAGOSCOPY IN THE SURGICAL REMOVAL OF FOREIGN BODIES FROM THE STOMACH. *(Pol.)* Janowski, B.; Jankowska, E. (Prison Hosp. Lodz, Poland). *Wiad. Lek.* 25(15):1343-1344, 1972.

0363 MENETRIER'S DISEASE (GIANT HYPERTROPHY OF THE GASTRIC MUCOSAL FOLDS) IN CHILDREN. *(Pol.)* Planeta-Malecka, I., Kulig, A.; Nowak, S.; Kuchowicz, B.; Wara-Wasowska, K. (Inst. Ped. Acad. Med. Lodz, Poland). *Pediatr. Pol.* 47(5):581-588, 1972.

0364 GASTRIC LESIONS FROM INGESTION OF POTASSIUM PERMANGANATE TABLETS. *(Fr.)* Mayer, J.; Choquart, P.; Frileux, C. (Hop. Bicetre, France). *Chirurgie* 98(8):487-491, 1972.

0365 ANTRECTOMY: TECHNIQUE. *(Fr.)* Boutelier, Ph. (Hop. Bichat, Paris, France). *Nouv. Presse Med.* 1(29):1949-1950, 1972.

0366 RECENT METHODS APPLIED IN THE EARLY DIAGNOSIS AND THERAPY OF GASTRIC CARCINOMA. *(It.)* Digiesi, V. (U. Firenze, Florence, Italy). *Riforma Med.* 86(18):699-713, 1972.

0367 THE CONDITION OF THE GASTRIC SECRETION IN PSORIASIS PATIENTS. *(Rus.)* Bogartyreva, A. (Novosibirsk Med. Inst., Novosibirsk, USSR). *Vestn. Derm. Vener.* (4):13-17, 1972.

See also 0001, 0010, 0047, 0092, 0124, 0201, 0202, 0207, 0216, 0224, 0225, 0232, 0240, 0263, 0268, 0270, 0276, 0279, 0290, 0292, 0311, 0390, 0399, 0421, 0429, 0438, 0481, 0840

STOMACH

Peptic Ulcers

0368 EFFECT OF GASTRIC SURGERY ON HISTAMINE STIMULATED SECRETION IN DUODENAL ULCER PATIENTS. *(E.)* Csendes, A.; Valenzuela, J. (Hospital Jose Joaquin Aguirre, Santiago, Chile). *Acta Gastroenterol. Latinoam.* 3(4):179-182, 1971.

Gastric acid secretion stimulated with a single dose of histamine was studied. After various surgical procedures eighty duodenal ulcer males were divided into three groups and subjected to the following operations: subtotal gastrectomy (21), vagotomy plus antrectomy (34) and vagotomy with pyloroplasty (25). There was a significant reduction in both basal and histamine stimulated acid output after all of the surgical procedures employed. Vagotomy plus antrectomy resulted in a significantly greater reduction after histamine stimulation than vagotomy plus pyloroplasty, but the results were similar to those obtained after subtotal gastrectomy.

0369 CHRONICITY OF ACETIC ACID ULCER IN THE RAT STOMACH. *(E.)* Okabe, S.; Pfeiffer, C.J. (Fac. of Pharm. Sci., Univ. of Tokyo, Japan). *Am. J. Dig. Dis.* 17(7):619-629, 1972.

The healing process in experimental gastric ulcers, produced by submucosal injection of acetic acid in rats, was studied. Small ulcers healed completely within 40 days after induction; moderately severe ulcers were sometimes found at 150 days, and probably resulted from repeated healing and reulceration. Large severe ulcers partially healed and then became reexacerbated; they frequently increased in size up to 250 days, thus resembling chronic gastric lesions. Throughout the experimental periods, adhesion of the ulcer base with adjacent organs and delayed gastric emptying were found in most animals. After ulceration, an increase in gastric volume and acid output and a decrease in protease activity of gastric contents were found in chronic fistula rats with experimental ulcers. The factors responsible for the reexacerbation of the experimental ulcer remain unidentified. The secretory changes observed may have been secondary to gastric ulceration and/or delayed gastric emptying.

0370 OBSERVATIONS ON THE HISTOLOGY OF THE GASTRIC MUCOSA IN CHRONIC GASTRIC ULCER. *(E.)* Thomas, E.; Hall, P.; Hislop, I.G. (Queen Elizabeth Hospital, Woodville, South Australia). *Am. J. Dig. Dis.* 17(8):683-688, 1972.

Biopsies were taken approximately 2 cm from the ulcer margin, and from the opposite wall of the stomach body, and the histologic changes were studied in the gastric mucosa of 18 patients with a chronic, lesser curve, gastric ulcer. Morphologic appearances noted in the active phase of ulceration were found to persist during the healing process (12 patients) and, on follow-up study, at 6 to 10 weeks (5 patients). The ulcer failed to heal in 6 patients, 5 were treated surgically and another refused operation; all had persisting gastritis. Twelve patients had been treated with carbenoxolone, which did not appear to influence histology. The uncertainty of the relationship between the ulcers and gastritis is evidenced by the ability of the ulcer to heal in the presence of continuing gastritis, the persistence of gastritis after the ulcer healed and the lack of difference in the surrounding mucosa between healed and unhealed ulcers.

0371 ANTIPEPTIC ACTIVITY OF A SULFATE GLYCOPEPTIDE. DIFFERENT BEHAVIOR WITH PURIFIED HUMAN PEPSIN OR HUMAN GASTRIC JUICE. *(E.)*

Prino, G.; Lietti, A.; Allegra, G. (Crinos Biol. Res. Labs., 22079-Villa Guardia, Italy). *Am. J. Dig. Dis.* 17(10):863-879, 1972.

The effects on peptic activity of a sulfated glycopeptide with antiulcer properties in animals and man were tested in vivo after oral administration to 10 patients with duodenal ulcer. A synthetic dipeptide, *N*-acetyl-L-phenylalanyl-L-diiodotyrosine, was used as substrate. Sulfated glycopeptide, 50, 100, and 200 mg, completely inhibited peptic activity 15 minutes after administration in 2 of 3 patients, 3 of 3 patients, and 4 of 4 patients examined, respectively. The inhibitory effect lasted 30 minutes in the lower-dose groups, while complete enzymatic inhibition lasted 1 hour in 2 patients of the 200 mg group. Sulfated glycopeptide inhibited peptic activity of human gastric juice but not of purified human pepsin in vitro. The results may indicate that pepsin is present in gastric juice as a component of a mucoprotein complex. Sulfated glycopeptide may inhibit pepsin activity in gastric juice by directly precipitating this glycoprotein complex.

0372 PYLORUS-PRESERVING GASTRECTOMY IN THE TREATMENT OF DUODENAL ULCER. *(E.)*

Hennessy, T. P. J.; Weir, D. G.; D'Auria, D. (Dept. of Surgery, Trinity College, Dublin, Ireland). *Br. J. Surg.* 59(1):27-29, 1972.

Pylorus-preserving gastrectomies were performed in twenty patients with duodenal ulcer. A functioning pyloric sphincter was maintained by retaining a 2-cm. cuff of antrum and carrying out a Billroth-I type of resection proximally. Following surgery, basal acid output was reduced by 52.4 per cent and maximal acid output by 65 per cent. Gastric emptying time was prolonged, without production of stasis. A provocative test for the presence of dumping provoked symptoms in only 1 patient following this operation; this contrasts with the high incidence of symptoms in patients who had had a Polya gastrectomy or vagotomy and drainage. The results suggest that the procedure may be of value in the treatment of chronic duodenal ulcer.

0373 FIVE- TO EIGHT-YEAR RESULTS OF TRUNCAL VAGOTOMY AND PYLOROPLASTY FOR DUODENAL ULCER. *(E.)*

Goligher, J. C.; Pulvertaft, C. N.; Irvin, T. T.; Johnston, D.; Walker, B.; Hall, R. A. (General Infirmary, Leeds, England). *Br. Med. J.* (5791):7-13, 1972.

Of 192 patients treated for duodenal ulcer by elective truncal vagotomy and pyloroplasty between January 1953-December 1965, 164 were followed up for 5-8 yrs. The results were compared with those obtained in an earlier study of duodenal ulcer patients 5-8 yrs after truncal vagotomy and gastroenterostomy, truncal vagotomy and antrectomy, or subtotal gastroenterostomy. Early dumping, late dumping, bilious vomiting, and diarrhea were less frequent after vagotomy and pyloroplasty than after vagotomy and gastroenterostomy; however, the difference in frequency of these postgastric operation symptoms was not significant. Incidence of proved and suspected recurrent ulcers was 6.7 and 7.3%, respectively, after vagotomy and pyloroplasty, 2.5 and 5.9% after vagotomy and gastroenterostomy, 0 and 5.2% after vagotomy and antrectomy, and 0.9 and 3.7% after subtotal gastrectomy. The differences between vagotomy and pyloroplasty and vagotomy and antrectomy or subtotal gastrectomy were statistically significant. Visick grading of the outcome gave poorer results after vagotomy and pyloroplastry than after any other operation, with 14% of category IV cases (unsatisfactory) after vagotomy and pyloroplasty, 11% after vagotomy and gastroenterostomy, 8% after vagotomy and antrectomy, and 6% after subtotal gastrecomy. Again, the differences between vagotomy and pyloroplasty, and vagotomy and antrectomy or subtotal gastrectomy were significant. These findings provide evidence that truncal vagotomy and pyloroplasty should be reconsidered as the surgical treatment of choice for duodenal ulcers.

0374 ACID SECRETION BEFORE AND AFTER PRECISE ANTRECTOMY FOR GASTRIC ULCER. *(E.)*

Amdrup, E.; Kragelung, E.; Jensen, H.E. (Community Hosp., Copenhagen, Denmark). *Bull. Soc. Int. Chir.* 31(2):84-89, 1972.

In 24 patients with gastric ulcers acid secretion was stimulated by injection of pentagastrin (3-6µg/kg) and the border between the antrum and corpus identified by intragastric pH measurements or by Congo red staining of the gastric mucosa through a gastrostomy. The entire antrum was resected and a gastroduodenal anastomosis made in most cases. Antrectomies performed in this way were complete in 15 patients and incomplete in 9, as determined by histological examination of biopsies from the specimens removed. Complete antrectomy eliminated insulin- and pentagastrin-stimulated acid secretion in patients with subnormal preoperative acid secretion (pentagastrin peak acid output 12 mEq/hr. A significant increase occurred in both insulin- and pentagastrin-stimulated acid secretion when the preoperative peak acid output was normal or high. Antrectomy combined with selective vagotomy did not completely eliminate pentagastrin-stimulated acid secretion. It is concluded that in patients with stomach ulcers the antrum is important in the mechanism of acid secretion activated by both pentagastrin and insulin.

0375 EFFECT OF WHALE GASTRONE PREPARATION ON THE EXPERIMENTAL PEPTIC ULCERS. *(E.)*

Chang, F. M.; Yii, J. Y.; Sung, J. L. (Coll. Med., National Taiwan Univ., Taipei, Republic of China). *J. Formosan Med. Ass.* 71(3):160-167, 1972.

The whale gastrone preparation was extracted by the method of Gregory and Tracy from the antral mucosa of the third stomach of a finback whale. Qauntitative and qualitative evaluation of this gastrone preparation in a series of experimental peptic ulcers produced in rats have shown that gastrone inhibited the pylorus ligation ulcer and the acetic acid ulcer production. Gastrone, however, showed no effect on the inhibition of the stress ulcer, serotonin ulcer, and the starvation ulcer production. The role of action of this gastric inhibitory substance may affect gastric acid secretion, thus extending its effect on the inhibition of peptic ulcer production.

0376 THE SAILOR'S STOMACH. *(E.)* Watt, J. (Inst. Naval Med., Alverstoke, Hants, England). *J.R. Nav. Med. Serv.* 58(1):12-34, 1972.

The incidence of peptic ulceration in the Royal Navy is highest in sedentary groups and lowest in active groups in which physical activity and job satisfaction appear to be important. It is higher than in a comparable civilian population and has been rising. Four factors appear directly responsible for the high incidence of peptic ulceration in sailors: the personality of those attracted to a seagoing life; operational conditions associated with tension, responsibility and man-power shortages; inadequate physical activity; and a diet rich in refined carbohydrates. Contributory factors are smoking, alcohol, noise, domestic unhappiness and intestinal parasites. A link appears to exist between peptic ulceration and urolithiasis in the Royal Navy. Gastric secretory studies have failed to provide meaningful information and high acid levels have been found in groups with the lowest incidence of peptic ulceration. Changes in catering arrangements, diet and conditions of service are unlikely to reduce the incidence of peptic ulceration.

0377 PARIETAL CELL CHANGES IN THE STOMACH AFTER ULCER OPERATIONS. *(E.)* Ritchie, W.P.; Delaney, J.P. (Univ. of Minnesota Health Sci. Center, Minneapolis). *J. Surg. Res.* 12(1):17-23, 1972.

Biopsies of the gastric remnant obtained 1, 3, and 6 months after truncal vagotomy with Heineke-Mikulicz pyloroplasty or truncal vagotomy with Billroth I-type reconstruction in dogs did not reveal any significant difference in the number of parietal cells are compared to controls. Administration of histamine in beeswax for 10 days resulted in essentially the same degree of parietal-cell hyperplasia as that seen in dogs with intact stomachs. Vagotomy and antrectomy with Billroth II-type reconstruction produced marked changes in the mucosa of the residual gastric pouch, such that by 6 months postoperatively, the mean number of parietal cells was diminished by 58% and the number of mucus-secreting cells markedly increased. Histologic examination of longitudinal strips of gastric mucosa taken at right angles to the gastrojejunostomy revealed a virtual absence of parietal cells within 3-5 cm of the anastomosis. The mucosa here was characterized by an inflammatory round cell infiltrate, mucus cell hyperplasia, and cystic dilatation of the glands. Thus although vagotomy and antrectomy per se do not significantly alter the parietal cell population in the normal canine stomach, the number of secretory elements decreases when the gastric remnant is bathed in jejunal contents. This explains the development of atrophic gastritis after Billroth II partial gastrectomy.

0378 VAGOTOMY AND PYLOROPLASTY IN CASE OF PERFORATED ULCER. *(Sp.)* Barreiro Alverez, F., Mateo Martinez, A.; Alvararez De La Marina, J. R.; Lopez Lopez, L.; Seco, J. L. (Ciudad Sanit. Seguridad Soc. "La Paz", Madrid, Spain). *Rev. Esp. Enferm. Apar. Dig.* 37(2):139-166, 1972.

0379 OBSERVATIONS OF SERUM ALPHA$_1$-ANTITRYPSIN WITH SPECIAL REFERENCE TO PEPTIC ULCER AND THE COMBINATION OF PEPTIC ULCER AND PULMONARY EMPHYSEMA. *(E.)* Kalliomaki, J. L.; Seppala, P. O. (Dept. Med., Univ. Turku, Finland). *Rend. Gastroenterol.* 3:159-162, 1971.

0380 INVESTIGATIONS OF DEFICIENCY ANEMIAS FOLLOWING GASTRECTOMY. *(Pol.)* Pietniewicz, J. (Klin. Surg. Inst. Hematol., Warsaw, Poland). *Pol. Tyg. Lek.* 27(22):825-827, 1972.

0381 A PHILOSOPHASTER LOOKS AT PEPTIC ULCER. *(E.)* Datta, S. (no affil.). *J. Indian Med. Assoc.* 58(4):135-149, 1972.

0382 MORTALITY AFTER VAGOTOMY AND PYLOROPLASTY FOR DUODENAL ULCER. *(E.)* Powis, S. J. A.; Price, J. J.; Morissey, D. M. (Roy. Hosp., Wolverhampton, England). *Br. Med. J.* 1(5793):142-144, 1972.

0383 THE PRESENT POSITION OF VAGOTOMY. *(E.)* Orecchia, C.; Sbuelz, B. (Dept. Surg., Hosp. S. Giovanni, Rome, Italy). *Chir. Gastroenterol.* 6(2):189-205, 1972.

0384 DYSINSULINISM AND PREDISPOSTION TO PEPTIC ULCER. Bonomo, G. M.; Patella, F. (Div. Surg. Dig. Tract, Univ. Bari, Italy). *Chir. Gastroenterol.* 5(4):449-457, 1971.

0385 GASTRIC STASIS AND GASTRIC ULCER AFTER SELECTIVE VAGOTOMY WITHOUT A DRAINAGE PROCEDURE. *(E.)* Clarke, R. J.; McFarland, J. B.; Williams, J. A. (Gen. Hosp., Birmingham, England). *Br. Med. J.* 1(5799):538-539, 1972.

0386 SELECTIVE PROXIMAL VAGOTOMY WITH AND WITHOUT PYLOROPLASTY. *(E.)* Wastell, C.; Colin, J. F.; MacNaughton, J. I.; Gleeson, J. (Gordon Hosp., London, England). *Br. Med. J.*, 1(5791):28-30, 1972.

0387 OPERATIVE TREATMENT OF HIGH GASTRIC ULCER WITH SPECIAL REFERENCE TO PAUCHET'S METHOD. *(E.)* Lewis, A.; Qvist, G. (Roy. Free Hosp., London, England). *Br. J. Surg.* 59(1):1-4, 1972.

0388 SURGICAL SURVEY OF PEPTIC ULCER IN SOUTH INDIA. *(E.)* Garlick, F. H.; Sundar Rao, P. S. S. (Christ. Med. Coll. Hosp., Vellore, Tamil Nadu, India). *Br. J. Surg.* 58(12):905-908, 1971.

0389 AN EXPERIMENTAL STUDY OF THE INCIDENCE OF GASTRIC ULCERS IN RABBITS FOLLOWING TRUNCAL VAGOTOMY, SELECTIVE GASTRIC VAGOTOMY, AND HIGHLY SELECTIVE GASTRIC VAGOTOMY. *(E.)* Amdrup, B. M.; Steinoe, K.; Bille-Brahe, N. E. (St. Joseph's Hosp., Copenhagen, Denmark). *Acta Chir. Scand.* 137(8):794-796, 1971.

0390 PROXIMAL GASTRIC VAGOTOMY WITHOUT DRAINAGE IN THE TREATMENT OF DUODENAL ULCER. *(Sp.)* De Miguel, J. (Valladolid, Spain). *Rev. Esp. Enferm. Apar. Dig.* 36(6):655-670, 1972.

0391 SUPREMACY OF THE PSYCHOLOGICAL FACTOR IN THE GASTRODUODENAL ULCER PROBLEMS. *(Sp.)* Martinez Romero, A. (no affil.). *Rev. Esp. Enferm. Apar. Dig.* 36(6):681-684, 1972.

0392 ULCER DISEASE AND PSYCHOSOMATIC PATHOLOGY. *(Sp.)* Casas Carnicero, J.; Rubio Sanchez, J. L. (Fac. Med. Valladolid, Spain). *Rev. Esp. Enferm. Apar. Dig.* 36(6):685-694, 1972.

0393 GASTRIC ULCER. ROUND TABLE WHICH TOOK PLACE AT THE BILBAO ACADEMY OF MEDICAL SCIENCES JANUARY 14TH 1972. *(Sp.)* Ibarguen Beitia, S.; Feijoo Caballero, L.; Goti Iturriaga, J. L.; Martinez Prudencio, P.; Sabas Olavarria, J. A.; Suarez Gonzalez, H. (no affil.). *Rev. Esp. Enferm. Apar. Dig.* 37(2):241-276, 1972.

0394 CANCER OF GASTRIC STUMP AFTER PARTIAL GASTRECTOMY PERFORMED FOR PEPTIC ULCER. *(Pol.)* Kanigowski, K.; Korfel, Z.; Sierko, S.; Wojdalski, J. (J. Sniadecki Dist. Hosp. Bialystok, Poland). *Pol. Tyg. Lek.* 27(23):873-875, 1972.

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0398 ULCER OF THE STOMACH AND DUODENUM. *(Sp.)* Muniz Gonzalez, J.; Cabrero Gomez, F. (Ciudad San. Provinc. F. Franco, Madrid, Spain). *Rev. Esp. Enferm. Apar. Dis.* 36(4):409-414, 1972.

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0400 HYDROCHLORIC ACID SECRETION IN GASTRIC ULCER. *(Sp.)* Benages Martinez, A.; Parilla Paricio, P.; Ridocci, M. T.; Gomez, J. M. R.; Aparisi Quereda, L.; Garcia Conde Gomez, F. J.; (Fac. Med., Valencia, Spain). *Rev. Esp. Enferm. Apar. Dig.* 36(4):401-408, 1972.

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0408 INTESTINAL OBSTRUCTION DUE TO ANTACID TREATMENT FOR DUODENAL ULCER: REPORT OF A CASE. *(E.)* Levinsky, L.; Urca, I. (Beilinson Hosp., Med. Sch., Univ. Tel Aviv, Petach Tiqwa, Israel). *Dis. Colon Rectum* 15(1):55-56, 1972.

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0411 GASTROINTESTINAL BLEEDING: A POSSIBLE ASSOCIATION WITH IBUPROFEN. *(E.)* Holdstock, D. J. (Ashford Hosp., Middlesex, England). *Lancet* (7749):541, 1972.

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0413 ON THE RECURRENCE OF GASTRIC ULCER. *(Jap.)* Fukui, O.; Tamura, K.; Kobyagawa, K; Hashimoto, T.; Hara, T. (Osaka Nat. Hosp., Japan). *Iryo* 26(1):15-25, 1972.

0414 EXPERIMENTAL STUDY ON THE GASTRIC SECRETION AFTER VARIOUS TYPES OF VAGOTOMY. *(Jap.)* Kushida, T. (Sh. Med., Tokushima Univ., Japan). *Shikohu Acta Med.* 27(9):503-515, 1971.

0415 TREATMENT OF GASTRODUODENAL ULCERS AND PEPTIC ESOPHAGITIS WITH A DEPROTEINATED EXTRACT OF CALF SERUM. *(Fr.)* Debray, C.; Paolaggi, J. A. (Hop. Bichat, Paris, France). *Therapeutique* 48(3):199-206, 1972.

0416 TREATMENT OF GASTRO-DUODENAL ULCER IN THE NORTH AFRICAN MILIEU. TRIAL OF SULPIRIDE --28 CASES. *(Fr.)* Parent, J. (no affil.) *Tunis. Med.* (1):61-63, 1972.

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0418 FREE PERFORATION OF GASTRIC AND DUODENAL ULCERS. *(Port.)* Barroso, F. L. (Esc. Med. Cir., Rio de Janeiro, Brazil). *Rev. Bras. Med.* 29(2):70-76, 1972.

0419 ULCER-LIKE DYSPEPSIA WITHOUT ULCERATION TREATED BY MEANS OF TRUNCAL VAGOTOMY AND DRAINAGE. *(Dan.)* Christiansen, J.; Aagaard, P.; Koudahl, G. (Kobenhavns amts Sygehus, Glostrop, Denmark). *Ugeskr. Laeger* 134(22):1154-1156, 1972.

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0421 SELECTIVE OR TRUNCAL VAGOTOMY? ANTRECTOMY OR PYLOROPLASTY? RESULTS AFTER A FIVE YEARS' FOLLOW-UP. *(Port.)* Chacon, J. P.; De Carvalho Whitaker, J. C. (Esc. Paul. De Med., Sao Paulo, Brazil). *Rev. Ass. Med. Brasil* 18(3):87-93, 1972.

0422 SURGICAL TREATMENT OF GASTRODUODENAL ULCERS BY MEANS OF SELECTIVE VAGOTOMY. *(Fr.)* Larrieu, H.; Maliakas, S.; Desvignes, G.; Poilleux, F. (no affil.) *Chirurgie* 98(6):409-416, 1972.

0423 EXPERIENCE WITH THE M.A.O. AND B.A.O. TECHNICS IN GASTRODUODENAL ULCER SURGERY. *(Sp.)* Diaz Velasquez, I. (Fac. Med. Sevilla, Spain) *Hispalis Med.* 29(334):233-246, 1972.

0424 DOUBLE BLIND TEST WITH SULPIRIDE IN THE MANAGEMENT OF GASTRODUODENAL ULCER. *(Fr.)* Legre, M. (Hop. De la Conception, Marseille, France). *Therapeutique* 48(5-6):415-418, 1972.

0425 THE ETIOLOGY AND PATHOGENESIS OF GASTRIC AND DUODENAL ULCER DISEASE. *(Bul.)* Kolikovski, N. G. (Med. Inst. Sofia, Bulgaria). *Suvr. Med.* 22(9):10-17, 1971.

0426 THE BODILY CONSTITUTION OF PATIENTS WITH DUODENAL ULCER. *(Bul.)* Kadanov, D.; Vulcheva, Y.; Petro, P. (Inst. Morphol. Bulgarian Acad. Sci, Sofia, Bulgaria). *Suvr. Med.* 22(9): 3-9, 1971.

0427 ULCER DISEASE INCIDENCE AMONG WORKERS EXPOSED TO HIGH TEMPERATURE CONDITIONS IN THE STEEL MANUFACTURING SHOP OF THE KREMIKOVTSI PLANT. *(Bul.)* Stoyanova, Zh.; Stanchev, P.; Dimitrova, M. (Inst. Occup. Med., Sofia, Bulgaria). *Suvr. Med.* 22(9):21-24, 1971.

0428 CLINICAL AND FUNCTIONAL CHARACTERIZATION OF ULCER DISEASE OCCURRING IN THE YAKUTSK ASSR. *(Rus.)* Krivoshapkin, V. G. (Yakutsk U., Yakutsk, USSR). *Sov. Med.* 35(3):142-143, 1972.

0429 MANAGEMENT OF PYLORIC STENOSIS FROM PEPTIC ULCER ASSOCIATED WITH HYPOKALEMIA. *(Pol.)* Tolloczko, A.; Puchalski, Z.; Piotrowski, Z.; Dzienis, H. (Acad. Med. Bialystok, Poland). *Wiad. Lek.,* 25(7):573-580, 1972.

See also 0051, 0220, 0222, 0229, 0232, 0248, 0251, 0258, 0270, 0316, 0326, 0327, 0333, 0336, 0338, 0339, 0345, 0488

0430 A POSSIBLE EXPLANATION FOR THE GASTROINTESTINAL MUCOSAL LESION IN IMMUNOGLOBULIN DEFICIENCY STATE. *(E.)* Dobbins, W.O.III.; Sahba, M.M. (VA Hosp., Washington, D.C.). *Am. J. Dig. Dis.* 17(1):23-35, 1972.

Intestinal biopsies obtained over a 6-year period from a patient with immunoglobulin deficiency revealed progression from a nearly normal mucosal villous structure to a flat mucosal lesion. Detailed light and electron microscopic analyses of the patient's intestinal mucosal biopsies showed no evidence that the lesion was related to bacterial or parasitic invasion. However, morphological studies indicated that the intestinal lesion was related to a viral enteritis. It is possible that infection of the intestinal cells by a myxovirus resulted in damage to some intestinal mucosal cells and slowed the growth of others: a reverse cancer effect. The data are not conclusive, and other mechanisms for the lesion cannot be ruled out.

0431 CELIAC-AXIS COMPRESSION SYNDROME: A REPORT OF 3 CASES. *(E.)* Barakat, M.; Mahmoud, J.; Bentlif, P.S. (Methodist Hosp. Kelsey-Seybold Clin., Houston, Tex.). *Am. J. Dig. Dis.* 17(4):373-377, 1972.

Abdominal pain caused by, or associated with compression of the celiac axis is a recognizable clinical syndrome in nonatherosclerotic young subjects, mostly women. Severe recurrent pain, the presence of an epigastric bruit, and the demostration of celiac artery compression by lateral aortography should suggest a diagnosis of the syndrome. Three female patients (14-44 yrs old) who were surgically treated by arterial decompression are described. Postoperatively, the patients became asymptomatic.

0432 JUVENILE DERMATITIS HERPETIFORMIS IN JAMAICA: CLINICAL AND GASTROINTESTINAL FEATURES. *(E.)* Warner, J.; Brooks, S,E.H.; James, W.P.T.; Louisy, S. (Univ. Coll. Hosp. Jamaica, West Indies). *Br. J. Dermatol.* 86(3):226-237, 1972.

Juvenile dermatitis herpetiformis is heavily preponderant over the adult form of the disease in Jamaica. Definite relationships between skin and gastrointestinal manifestations in adult disease have been reported elsewhere. The clinical features and investigations relating to gastrointestinal function are present in 12 cases of juvenile dermatitis herpetiformis seen over a period of 2 years in Jamaica. None of the children had evidence of steatorrhoea. Jejunal biopsy in 10 cases showed normal mucosa in one, ridging and convolutions in eight and a flat mucosa in one. Electron microscopic changes are also described. Lactase deficiency and lactose intolerance were common. These findings may be related to malnutrition in infancy or at the time of biopsy. An interesting feature was relapse following iodine contrast media used during jejunal biopsy and a high incidence of iodine in drinking water in some parts of Jamaica.

0433 PATHOGENESIS OF STEATORRHEA IN THREE CASES OF SMALL INTESTINAL STASIS SYDROME. *(E.)* Ament, M.E.; Shimoda, S.S.; Saunders, D.R.; Rubin, C.E. (Dept. Med., Univ. Washington, Seattle). *Gastroenterology* 63(5):728-747, 1972.

Steatorrhea in small intestinal stasis syndrome is often attributed to defective luminal micelle formation secondary to deconjugation of bile salts by excessive numbers of bacteria. The intestinal mucosa is usually presumed to be normal small intestinal stasis syndrome of differing etiologies.
The pathogenesis of steatorrhea was investigated in three patients with multiple jejunal diverticula, scleroderma, and idiopathic intestinal pseudo-obstruction. Although bacterial overgrowth and some deconjugation of bile salts was demonstrated in all 3 of these patients, normal amounts of free fatty acids were solubilized in the aqueous phase of jejunal contents aspirated during a fat meal, indicating normal jejunal micelle formation by the remaining conjugated bile salts. When a sufficient number of jejunal biopsies were taken, patchy abnormalities were revealed by light microscopy in all 3 patients. This histological appearance varied widely in each patient from little or no abnormalities in villus architecture, to serve lesions with virtual absence of villi. Electron microscopy revealed far more extensive intestinal abnormalities than had been suspected after light microscopy. Defects in mucosal fat absorption demonstrated by electron microscopic examination of jejunal biopsies taken during a fat meal included: decreased numbers of fat particles in absorptive cells; decreased numbers of absorptive cells participating in fat absorption; and impaired transport of chylomicrons out of the absorptive cells into the lamina propria. After antibiotic treatment fat absorption improved and there was electron microscopic evidence of chylomicron transport out of the absorptive cells, whereas other abnormalities remained unchanged. Although the etiology of the jejunal mucosal lesions in these 3 patients remains unclear, our studies suggest that absorptive cell dysfunction rather than defective micelle formation is an important factor in the pathogenesis of their steatorrhea.

0434 INTEREPITHELIAL LYMPHOCYTES IN ENTEROPATHIES. *(Ger.)* Otto, H. F. (Pathol. Inst. Univ. Hamburg, Germany). *Z. Gastroenterol.* 10(3):173-179, 1972.

Lymphocyte-epithelium relationships were examined under the optical and electron microscopes in small intestine biopsies from patients with various enteropathies, in an attempt to elucidate the role of lymphocyte-mediated immune mechanisms in these diseases. Percentages of lymphocytes located in the infranuclear, intermediate, and supranuclear positions as well as total numbers of lymphocytes in each specimen were tabulated and statistically analyzed for each disease. Significantly elevated numbers of interepithelial lymphocytes were found in celiac disease, Crohn's disease, and ulcerative colitis and proctocolitis. Interepithelial lymphocytes in normal intestinal mucosa were generally small and found in infranuclear locations. In the conditions with increased lymphocyte counts, the lymphocytes were also generally enlarged, and a variety of epithelial-cell abnormalities were seen. Many of the interepithelial lymphocytes in these conditions are activated or transformed, and mitoses are sometimes seen. The lymphocytes thus appear to be capable of acting as immunologically competent cells, responding to antigens.

0435 DISORDERS OF MEMBRANE DIGESTION AND THEIR CORRELATION WITH MORPHOLIGICAL ALTERATIONS OF THE SMALL INTESTINE IN CHRONIC ENTEROCOLITIS. *(Ger.)* Frolkis, A.; Fedotowa, O. (O.-W-Kussinen-Univ., Petrozavodsk, USSR). *Z. Ges. Inn. Med.*, 27(5):215-220, 1972.

Structural changes in the mucous membrane of the small intestine were examined in 101 patients with chronic enterocolitis and 12 healthy persons by aspiration biopsy. At the same time the membrane digestion was tested via amylase and lipase activity. The use of EDTA permitted separation of α-amylase and γ-amylase. In the patients with enterocolitis dystrophic as well as atrophic changes were found in the mucous membrane biopsies corresponding o a chronic jejunitis without or with partial atro- hy of the villi. The activity of amylase and lipase involved in membrane digestion are decreased n patients with chronic enterocolitis in the esorbed fractions as well as in the homogenate fraction. The disorders of membrane digestion epend upon severity and duration of the disease nd are closely correlated with weight loss. he disturbances in membrane digestion parallel he morphological changes in the small intestine ucous membrane. As the latter increase, the mylase and lipase activities decrease within he membrane digestion. The lowest enzyme activity s observed in chronic jejunitis with partial trophy of the villi. A close correlation between he amylase and lipase activities and the level of he villi was also established. The investigations sing EDTA have shown that the hypofunction of embrane digestion in enterocolitis above all evelops due to a decrease in the actual intestinal mylase (γ-amylase).

436 INVESTIGATIONS OF SMALL INTESTINE MUCOSA DURING X-RAY THERAPY APPLIED TO THE ABDOMEN. alina, Z.; Foremny, Z.; Tokarz, S.; Rozek, K. (Acad. ed. Katowice, Poland). *Pol. Tyg. Lek.* 26(45):1743-744, 1971.

37 INTESTINAL DIVERTICULA. *(Pol.)* Bochenek, W.; Labuda, J.; Starzyk, J. (Acad. Med. roclaw, Poland). *Pol. Tyg. Lek.* 27(6):229-231, 1972.

0438 DUODENAL PERFORATION TREATMENT BY COMBINED VAGOTOMY AND PYLOROPLASTY. *(Sp.)* Curto Cardus, J. A.; Henriquez De Gaztanondo, C. A. (Resindencia Sanit. "Juan XXIII", Terragona, Spain). *Rev. Esp. Enferm. Apar. Dig.* 37(3):331-346, 1972.

0439 TREATMENT OF PERFORATED DUODENAL DIVERTICULA. *(E.)* Blomstedt, B.; Holm, I. (Sabbatsberg Hosp., Stockholm, Sweden). *Acta Chir. Scand.* 138(2):211-214, 1972.

0440 *IN VITRO* INTESTINAL EXCHANGES OF Na^+, K^+, Cl^- ^3H_2O IN EXPERIMENTAL BOVINE NEONATAL ENTERITIS. *(E.)* Whitten, E. H.; Phillips, R. W. (Dept. Physiol. Biophys., Colorado St. Univ. Fort Collins). *Am. J. Dig. Dis.* 16(10):891-902, 1971.

0441 THE EFFECTS OF LARGE DOSES OF ASPIRIN AND CORTISONE ON THE GOBLET CELLS AND THE MUCOSAL MEMBRANES IN THE SMALL AND LARGE INTESTINE. *(E.)* Takeuchi, T.; Ensrud, E. R.; Steggerda, F. R. (Dept. Physiol. Biophys., Univ. Illinois, Urbana, Ill.). *Am. J. Dig. Dis.* 17(1):49-53, 1972.

0442 RUBIN BIOPSY TUBE ENTRAPPED IN DUODENUM. *(E.)* Nogueira, J. R.; Freedman, M. A. (General Rose Memorial Hosp., Denver, Colo.). *Am. J. Dig. Dis.* 17(6):557-558, 1972.

0443 EFFECT OF ILEAL BYPASS ON CHOLESTEROL LEVELS, ATHEROSCLEROSIS AND GROWTH IN THE INFANT RABBIT. *(E.)* Buchwald, H.; Moore, R. B.; Bertish, J.; Varco, R. L. (Dept. Surg., Univ. Minnesota Hospitals, Minneapolis). *Ann. Surg.* 175(3):311-319, 1972.

0444 ILEAL BLOOD FLOW PRECEDING COMPENSATORY INTESTINAL HYPERTROPHY. *(E.)* Touloukain, R. J.; Spencer, R. P. (Dept. Surg., Yale Univ. Sch. Med., New Haven, Conn.). *Ann. Surg.* 175(3):320-325, 1972.

0445 VOLUME DEFICIT VERSUS TOXIC ABSORPTION: A STUDY OF CANINE SHOCK AFTER MESENTERIC ARTERIAL OCCLUSION. *(E.)* Chiu, C. J.; Scott, H. J.; Gurd, F. N. (Dept. Surg., McGill Univ., Surgical Clinical of the Montreal General Hosp., Montreal 109, Quebec, Canada). *Ann. Surg.* 175(4):479-488, 1972.

0446 CARCINOMA OF THE DUODENUM. *(E.)* Kenefick, J. S. (Royal Free Hosp., London, England). *Br. J. Surg.* 59(1):50-55, 1972.

0447 INTESTINAL ISCHAEMIA. *(E.)* Anonymous. *Br. Med. J.* 2(5804):3, 1972.

0448 DOUBLE RETROPERITONEAL RUPTURE OF THE DUODENUM IN A CASE OF CLOSED ABDOMINAL INJURY. *(E.)* Esposito, G.; Bassi, G.; Cantalupo, C.; Angelini, G.; Iemma, D. (United Hosp., Naples-22nd First Aid Unit & Surg. Emergency Dept., Cardarelli Hosp. Naples, Italy). *Chir. Gastroenterol.* 5(4):499-509, 1971.

0449 A CONTRIBUTION TO THE SURGICAL TREATMENT OF EXTERNAL DUODENAL FISTULAE OF THE LATERAL TYPE. *(E.)* Asole, F.; Di Giovanni, V. (Inst. Surg. Spec. Elementary Clin. Educ. of the Catholic Univ. of the Sacred Heart, Rome, Italy). *Chir. Gastroenterol.* 5(4):510-520, 1971.

0450 DUODENO-COLIC FISTULAE OF DELAYED ONSET FOLLOWING GASTRIC RESECTION. *(E.)* Peracchia, A.; Morosini, S. (Chair of Surgical Studies, Univ. Parma, Italy). *Chir. Gastroenterol.* 6(1):55-63, 1972.

0451 INTESTINAL OCCLUSION DUE TO AN INTRAMURAL HAEMATOMA OF THE SMALL INTESTINE. A RARE COMPLICATION OF ANTI-COAGULANT TREATMENT. *(E.)* Meyer, Ch.; Otteni, R.; Hollender, L. F. (Univ. Strasbourg, France). *Chir. Gastroenterol.* 6(1):64-72, 1972.

0452 PRELIMINARY STUDIES ON THE EFFECTS OF CAERULEIN IN PARALYTIC ILEUS. *(E.)* Agosti, A.; Paolucci, R.; Zanella, E.; Bertaccini, G. (Univ. Parma, Italy). *Chir. Gastroenterol.* 6(2):122-128, 1972.

0453 STIMULATION OF SMALL INTESTINAL MUCOSAL ENZYMES DURING COXSACKIE VIRUS INFECTION IN NEONATAL MICE. *(E.)* Hammond, J. B.; Rosenberg, J. L. *J. Lab. Clin. Med.* 79(59):814-823, 1972.

0454 TUMOUR IMPLANTATION IN ISCHEMIC, THERMIC AND MECHANICAL LESIONS OF THE COLONIC MUCOSA. *(E.)* Broyn, T. (Ulleval Hosp., Oslo, Norway). *Acta Chir. Scand.* 138(2):202-206, 1972.

0455 MORPHOLOGY OF THE GASTROINTESTINAL TRACT MUCOSAE IN CHOLERA PATIENTS (ACCORDING TO ASPIRATION BIOPSY DATA). *(Rus.)* Pokrovskiy, V. I.; Shalygina, N. B.; Dashevskiy, Yu. Ya.; Mashilov, V. P.; Lazukina, L. N. (Central Sci. Res. Inst. Epidemiol., Moscow, U.S.S.R.). *Vestn. Akad. Med. Nauk SSSR* 27(5):77-84, 1972.

0456 UNUSUAL TRAUMATIC LESIONS OF THE DUODENUM AND PANCREAS. *(Sp.)* Martinez Rodriguez, E. (Hosp. Accidentes Adaro, Sama de Langreo, Spain). *Rev. Esp. Enferm. Apar. Dig.* 37(5):627-632, 1972.

0457 TECHNIQUE AND RESULTS OF JEJUNAL ALIMENTATION. *(Fr.)* Kinnert, P.; Steenwinkel, C.; Buchin, R.; Govaerts, J. P.; Kiekens, R.; Van Geertruyden, J. (Hop. Brugmann, Univ. Libre Bruxelles, Belgium). *Acta Gastroent. Belg.* 34(12):794-806, 1971.

0458 INTESTINAL LYMPHAGIECTASIA IN NEPHROSIS. A STUDY IN THE RAT. *(E.)* de Sousa, J. S.; Cunha, A.; de Carvalho, C. (U. Lisboa, Clin. Pediatr., Portugal). *Arq. Gastroenterol.* 9(1):17-20, 1972.

0459 DUODENAL ABERRANT PANCREAS, AN UNUSUAL CAUSE OF OBSTRUCTIVE JAUNDICE, CASE REPORT. *(Sp.)* Berenguer, J.; Sala, T.; Carrasquer, J.; Rodrigo, M.; Garrido, G.; Pertejo, Y. (Ciud. San. Segur. Soc. La Fe, Valencia, Spain). *Rev. Esp. Enferm. Apar. Dig.* 36(5):567-574, 1972.

0460 ACUTE ABDOMEN DUE TO NECROTIZING ENTERITIS. (OBSERVATIONS ON THREE CASES). *(Sp.)* Sarro Palau, M.; Rubio Roig, J. (Hosp. Clin. Barcelona, Spain). *An. Med. (Barcelona)* 58(1):152-166, 1972.

0461 A CASE OF ILEOCOLIC INVAGINATION IN AN INFANT, TREATED SURGICALLY ON THE THIRTEENTH DAY. *(Fr.)* Ficini, R. (Hop. Mohammed V, El Jadida, Morocco). *Maroc. Med.* 52(555):179-182, 1972.

0462 ISOLATED JEJUNAL LOCALIZATION OF HODGKIN'S DISEASE. *(Fr.)* Gaucher, P.; Floquet, J.; Bigard, M.A.; Puchelle, J.C.; Fourati, R. (no affil.). *Tunis. Med.* (1):57-59, 1972.

0463 REVERSIBLE DUODENAL STENOSIS. *(Ger.)* Wagner, A.; Schneider, V. (Med. Univ.-Poliklin. Heidelberg, Germany). *Z. Gastroenterol.* 10(3):169-172, 1972.

0464 MECHANICAL INTESTINAL OBSTRUCTION IN DAKAR. *(Fr.)* Vavor, M. V.; Odoulami, H.; Goudote, E.; Diop, A.; Mouchili, D.; Zinsou, R.-D. (C.H.U., Dakar, Senegal). *Bull. Soc. Med. Afr. Noire Lang. Fr.* 16(4):635-643, 1971.

0465 INTRAMURAL HEMATOMA OF THE DUODENUM IN CLOSED TRAUMA OF THE ABDOMEN. PRESENTATION OF A CASE AND REVIEW OF THE LITERATURE. *(Fr.)* Farah, P. (377, Rue Michel China, Beirut, Lebanon). *J. Med. Liban.* 24(6):695-708, 1971.

0466 ADENO-CARCINOMA OF THE JEJUNUM--A CASE REPORT WITH UNUSUAL PRESENTATION. *(E.)* Gupta, R.K.; Chopra, P.; Mitra, D.K.; Upadhyaya, P. (All India Inst. Med. Sci., New Delhi). *Indian J. Surg.* 34(1):41-42, xiii-xiv, 1972.

0467 INTESTINAL HEMORRHAGE IN TYPHOID FEVER. *(E.)* Castillio, R.; Tiu, A.; Cruz, Jr., F; Pangan, Jr., J. (Santo Tomas Univ. Hosp., Manila, Philippines). *Santo Tomas J. Med.* 26(4):309-318, 1971.

0468 INTRAMURAL HEMATOMA OF THE INTESTINE FROM ANTICOAGULANTS. (THREE CASES INCLUDING ONE WITH HEMATOMA OF THE COLON). *(Fr.)* Huguier, M.; Vinh, T.S.; Cerbonet, G. (Hop. Rothschild, Paris, France). *Chirurgie* 98(7):427-432, 1972.

0469 A CASE OF PERFORATION OF THE ILEUM AFTER INGESTION OF POTASSIUM CHLORIDE TABLETS.

(Fr.) des Mesnards, G. (no affil.). *Chirurgie* 98(7):468-470, 1972.

0470 INTESTINAL INFARCTION AFTER BLUNT ABDOMINAL TRAUMA. *(Ger.)* Huber, F.B. (Chirurg. Abteilung Spital Limmattal, Schlieren-Zuerich, Switzerland.). *Schweiz. Med. Wochenschr.* 102:339-341, 1972.

0471 LONG-TUBE GASTROSTOMY WITH INTERNAL INTESTINAL SPLINTING IN INFLAMMATORY DISEASE OF THE SMALL INTESTINES. *(E.)* Throw, G.B. (no affil.). *Dis. Colon Rectum* 15(1):7-10, 1972.

0472 CARCINOMA OF THE DUODENUM. *(E.)* Cortese, A.F.; Cornell, G.N. (The New York Hosp. Cornell Med. Cent., New York, N.Y.). *Cancer* 29(4):1010-1015, 1972.

0473 VILLOUS ADENOMA OF THE DUODENUM. *(E.)* Dayal, Y.; Bass, A.G.; Kraft, A.R.; Glotzer, D.J.; Goldman, H. (Tufts-New England Med. Cent. Hosp., Boston, Mass.). *Am. J. Surg.* 124(3):394-398, 1972.

0474 INFLUENCE OF PREVIOUS GASTRECTOMY ON MAJOR BLUNT DUODENAL INJURY. *(E.)* Strauch, G.O. (Stamford Hosp., Stamford, Conn.). *Am. J. Surg.* 124(3):399-403, 1972.

0475 INTESTINAL OBSTRUCTION IN AN ADULT WITH CYSTIC FIBROSIS. *(E.)* Seliger, G.; Firooznia, H.; Genieser, N.B. (Dept. Radiol., N.Y. Univ. Med. Cent., N.Y.). *Am. J. Dig. Dis.* 17(10):934-938, 1972.

0476 DIVERTICULOSIS OF THE TERMINAL ILEUM AND ITS COMPLICATIONS. *(E.)* Parulekar, S.G. (Mt. Sinai Hosp., Cleveland, Ohio). *Radiology* 103(2):283-288, 1972.

0477 CONGENITAL DUODENAL DIAPHRAGM IN AN ADULT. *(E.)* Hillson, R.F.; Den Besten, L.; Zike, W.L.; Cohen, W.N. (Univ. Iowa Hosp., Iowa City). *Postgrad. Med.* 51(3):119-123, 1972.

See also 0189, 0209, 0219, 0222, 0242, 0318, 0340, 0346, 0347, 0398, 0597, 0647, 0808, 0840, 0843, 0864, 0868, 0869, 0882, 0904

SMALL INTESTINE

Regional Enteritis

0478 CROHN'S DISEASE OF THE DUODENUM (TRANSMURAL DUODENITIS): CLINICAL MANIFESTATIONS. *(E.)* Farmer, R. G.; Hawk, W. A.; Turnbull, R. B., Jr. (The Cleveland Clinic Found. and The Cleveland Clinic Educational Found., Cleveland, Ohio). *Am. J. Dig. Dis.* 17(3):191-198, 1972.

0479 EOSINOPHILIA AND REGIONAL ENTERITIS. *(E.)* Haeberle, M. G.; Griffen, W. O., Jr. (Dept. Surg., Univ. Kentucky Med. Center, Lexington). *Am. J. Dig. Dis.* 17(3):200-204, 1972.

0480 CROHN'S DISEASE, 1961-1971. *(E.)* Cufley, G.A.; Gregory, D.H.; Danemann, H.; Law, D.H. (Albuquerque Hosp., N.M.). *Am. J. Dig. Dis.* 17(10):954-955, 1972.

0481 CROHN'S DISEASE OF THE ESOPHAGUS, STOMACH AND DUODENUM: *(E.)* Bagby, R.J.; Rogers, J.V., Jr.; Hobbs, C. (Emory Univ. Hosp., Atlanta, Ga.). *South. Med. J.* 65(5):515-523, 1972.

0482 FREQUENCY OF REGIONAL ENTERITIS IN THE EASTERN DISTRICTS. *(Fr.)* Nootens, J.; Devroede, Gh. (Centre Hosp. U. Sherbrooke, Quebec, Canada). *Un. Med. Canada* 101(6):1138-1140, 1972.

0483 UTILIZATION OF CYTOSTATIC DRUGS IN THE TREATMENT OF CHRONIC INTESTINAL DISEASE. *(Ger.)* Kettner, W. (Carl Gustav Carus Med. Akad. Dresden, Germany). *Z. Ges. Inn. Med.* 27(11):470-473, 1972.

See also 0858

SMALL INTESTINE

Malabsorption

0484 WHIPPLE'S DISEASE: CHARACTERIZATION OF ANAEROBIC CORYNEBACTERIA AND DEMONSTRATION OF BACILLI IN VASCULAR ENDOTHELIUM. *(E.)* Greenberger, N.J.; DeLor, J.; Fisher, J.; Perkins, R.L.; Murad, T.; Kapral, F. (Ohio State U. Coll. Med., Columbus). *Am. J. Dig. Dis.* 16(12):1127-1136, 1971.

A Corynebacterium anaerobium was cultured from mucosa of the small intestine and from mesenteric lymph nodes of a patient with well-documented Whipple's disease. Electron microscopic studies demonstrated the organisms in the mucosa, lymph nodes, and also in endothelial cells lining the blood vessels. These observations provide additional evidence that Corynebacteria microorganisms are implicated in Whipple's disease, but the precise role of the bacilli in the pathogensis of the disease remains to be elucidated.

0485 MALABSORPTION IN NEONATAL PIGS MONOCONTAMINATED WITH *ESCHERICHIA COLI* (055B5).

(E.) Staley, T. E., Corley, L. D.; Jones, E. W. (Coll. of Vet. Med., Oklahoma State Univ., Stillwater). *Am. J. Dig. Dis.* 17(3):239-247, 1972.

Intestinal absorption of whole horse serum, horse immunoglobulin G, and horse albumin was studied in newborn unfed pigs, after suckling, after starving, and after starving and monocontamination with *Escherichia coli*. All horse serum proteins were readily absorbed by all groups of piglets. The amount of absorption of a single test dose of protein was shown to decrease during the first 2 days of life, rapidly in suckled pigs and more slowly in starved pigs. The reduction in horse serum absorption in starved piglets monocontaminated with *E. coli* paralleled that in suckled pigs. It has not been determined whether the action of *E. coli* represents a cytopathologic effect or mere stimulation of normal closure mechanisms.

0486 PRECIPITINS TO DIETARY PROTEINS IN SERUM AND UPPER INTESTINAL SECRETIONS OF COELIAC CHILDREN.

(E.) Ferguson, A.; Carswell, F. (Western Infirm., Glasgow, Scotland). *Br. Med. J.* (5972): 75-77, 1972.

A micro-gel diffusion technique was used to detect precipitating antibodies to 10 dietary proteins in serum from 33 celiac children and 38 nonceliac children. Fifty-one of the 71 children were also tested for intestinal secretion of antibodies to proteins. All but six of the 33 celiac children had serum precipitins (to the antigens wheat flour, gluten, oatmeal, rice flour, milk, bovine calf serum, sheep serum, and egg). Of the 34 nonceliacs aged more than 6 months, only two had serum precipitins (to milk and bovine calf serum). In contrast, three of the four nonceliacs younger than 6 months had serum precipitins to several antigens. Precipitins to one or more dietary antigens were detected in intestinal secretions of 26 of the 30 celiacs tested and of 11 of 21 children without celiac disease. Most positive tests were with the antigens wheat flour, gluten, oatmeal, and egg. Precipitins to wheat flour of gluten were present in the secretions of 22 of 30 celiacs and eight of 21 nonceliacs.

0487 THE IMMUNOPATHOLOGY OF COELIAC DISEASE.

(E.) Shiner, M.; Shmerling, D. H. (Central Middlesex Hospital, London, England). *Digestion* 5:69-88, 1972.

The appearance of the jejunal villous cell and its subepithelial tissues under the electron microscope was examined before and after a single dose of gluten. Findings in 3 celiac patients were compared with those in a non-celiac child. Up to 48 hr after gluten administration the epithelial cells of the celiac patients showed no abnormality. However, the subepithelial basement membrane was thickened, the capillary endothelium showed swelling and there was an increased infiltration of lymphocytes, eosinophils and plasma cells in the intercellular and subepithelial spaces. Epithelial damage was seen at 96 hr after gluten in only one of 2 patients. The ultrastructural changes in the non-celiac child 24 hr after gluten were entirely confined to the epithelial cell itself and consisted of large intracytoplasmic vacuoles, lined by smooth membranes which contained fibrous and other unidentifiable material. The absence of an intracellular reaction at least in the early stages following gluten in the celiac patients could be due to an ineffectiveness in walling-off exogenous material such as gluten. This may be of importance in allowing antigenic material to pass through the cell thus setting up immunological reactions in the subepithelial connective tissue and nearby capillary endothelium.

0488 HYDROXY FATTY ACIDS IN HUMAN DIARRHEA.

(E.). Soong, C.C.; Thompson, J.B.; Poley, J.R.; Hess, D.R. (Univ. Oklahoma Health Sci. Center, Oklahoma City, Okla.). *Gastroenterology* 63(5):748-757, 1972.

Fecal hydroxy fatty acids were measured by gas-liquid chromatography in healthy control subjects and three disease groups: 16 postgastric surgery patients, 10 patients with small bowel disease, and 12 patients with pancreatic insufficiency. These three disease groups were characterized by diarrhea and/or steatorrhea of varying degree documented by fecal fat and mean daily fecal wet weight. Qualitative gas-liquid chromatography indicated that the principal fecal hydroxy fatty acid fraction was hydroxystearate. All these clinical groups had significantly higher fecal hydroxy fatty acid and mean daily fecal wet weights than the normal control population. In both postgastric surgery and pancreatic insufficiency groups, patients with diarrhea had higher values for fecal hydroxy fatty acid than those without diarrhea. All of the small bowel group had some diarrhea, and only those with mild diarrhea and no steatorrhea had normal fecal hydroxy fatty acids. Therapy of hydroxy fatty acid-associated diarrhea in 2 patients by use of medium chain triglycerides was followed by clinical cessation of diarrhea and a sharp decrease in fecal hydroxy fatty acids. It therefore seems that fully saturated medium chain triglycerides are not substrates for bacterial conversion to hydroxy fatty acids. The data presented in this paper support the hypothesis that the bacterial production of hydroxy fatty acids from dietary unsaturated long chain fatty acids may result in diarrhea in several categories of patients.

0489 SEPARATION OF INTESTINAL β-GALACTOSIDASES BY ULTRACENTRIFUGATION IN A DENSITY GRADIENT IN BIOPSIES FROM LACTOSE-TOLERANT ADULTS. *(Ger.)* Rotthauwe, H.W.; Flatz, G.; Emons, D.; Heisig, A. (Universitaets-Kinderklinik, Bonn, Germany). *Klin. Wochenschr.* 50(5):258-259, 1972.

Intestinal β-galactosidases in suction biopsy material from four lactose-tolerant adults were separated, after solubilization with Triton X-100, in a linear 5-20% mannitol gradient by ultracentrifugation at 4 C and 44,000 rpm. Three fractions were identified after 12 hr of centrifugation: all three hydrolyzed p-nitrophenyl-β-galactoside, and the two fractions that sedimented the most rapidly were active with lactose as substrate. The three isolated β-galactosidases appeared to correspond to the "neutral" brush border lactase, the "acid" lysosomal lactase, and a cytoplasmatic hetero-β-galactosidase.

0490 SEPARATION OF INTESTINAL β-GALACTOSIDASES BY ULTRACENTRIFUGATION IN A DENSITY GRADIENT IN BIOPSIES FROM LACTOSE-INTOLERANT ADULTS. *(Ger.)* Rotthauwe, H. W.; Flatz, G.; Emons, D.; Heisig, A. (Universitaets-Kinderklinik, Bonn, Germany). *Klin. Wochenschr.* 50(5):260-261, 1972.

Intestinal β-galactosidases from 11 adult probands with lactose intolerance were separated by density gradient centrifugation. The "neutral" brush border lactase and the "acid" lysosomal lactase were identified in the biopsy material of all subjects. The brush border lactase was markedly lower than in lactose-tolerant adults. The hetero-β-galactosidase, which is present as a slowly sedimenting enzyme in lactose-tolerant adults, was absent in the 11 subjects.

0491 FLOATING STOOLS-FLATUS VERSUS FAT. *(E.)* Levitt, M.D.; Duane, W.C. (Univ. of Minnesota Hospitals, Minneapolis). *N. Engl. J. Med.* 286(18):973-975, 1972.

Stools from 33 healthy subjects, nine with floating stools and 24 with sinking stools, and six patients with steatorrhea were investigated to find factors which influenced stool density. All floating stools sank when their gas volume was compressed by positive pressure. Thus, to float, stools must contain gas. After degassing, previously floating and sinking stools had similar specific gravities, indicating that the floating or sinking propensity of such stools depends upon differences in gas rather than fat content. A high stool gas content in healthy subjects appeared related to colonic methane production. Steatorrheic stools had a relatively normal gas content. The density of their nongaseous fraction was less than normal, but resulted primarily from increased water rather than fat content. The difference in specific gravity between fat (e.g., oleic acid) and water is so slight that it would be theoretically almost impossible for a stool to float solely because of its elevated fat content.

0492 INFANCY CELIAC DISEASE WITHOUT DIARRHEA. *(E.)* McNicholl, B.; Egan-Mitchell, B. (Regional Hosp. and Univ. Coll., Galway, Ireland). *Pediatrics* 49(1):85-91, 1972.

Three infants presenting at about 1 year of age with partially atypical celiac symptoms were found to have severe mucosal atrophy characteristics of celiac disease. Symptoms included failure to thrive, anorexia, vomiting, and varying degrees of constipation, but no diarrhea. Each infant had fecal retention on admission, none had steatorrhea, and they all thrived well on gluten-free, milk-containing diets. Other investigations, including sugar tolerance tests, mucosal lactase, and dipeptidases were confirmatory. High IgA levels were found in each infant and low IgM in one. Although occurrence of celiac disease without diarrhea or steatorrhea is recognized in older children and adults, it must also be considered as a cause of failure to thrive in infants without these symptoms, particularly when other causes cannot be found.

0493 ENTERIC MICROFLORA AND CARBOHYDRATE INTOLERANCE IN INFANTS WITH DIARRHEA. *(E.)* Coello-Ramirez, P.; Lifshitz, F. (Univ. Maryland Hosp., Baltimore). *Pediatrics* 49(2):233-241, 1972.

The relationship between enteric microflora and carbohydrate tolerance was investigated in 50 infants with severe diarrhea. During the acute stage of illness, 23 infants had a specific lactose tolerance, eight a generalized disaccharide intolerance, and three a monosaccharide intolerance. All patients had a nonspecific proliferation of bacteria in the small intestine. Bacterial counts in duodenal aspirates increased linearly with increasing severity of carbohydrate intolerance. Lactose-tolerant infants had the lowest bacterial counts. A stepwise increase in bacterial growth was observed for specific lactose-intolerant, generalized disaccharide-intolerant, and monosaccharide-intolerant patients. Bacterial counts increased in seven patients who developed a more severe carbohydrate intolerance after a period of diarrhea. Improvement in diarrhea brought about a reduction in bacterial growth and an improvement in patient capacity to tolerate carbohydrates. The most commonly encountered organisms were klebsiella species, followed by *Escherichia coli*, enterocci, and pseudomonas. The bacteria isolated from the duodenum differed from organisms in the feces in 24 patients. The proliferation of bacteria in the small bowel of infants with diarrhea may be related to the presence of undigested carbohydrates.

0494 LACTASE DEFICIENCY IN NIGERIANS. *(E.)* Olatunbosun, D. A.; Kwaku Adadevoh, B. (Dept. Chem. Pathol., Univ. Ibadan, Nigeria). *Am. J. Dig. Dis.* 16(10):909-914, 1971.

0495 ACUTE MYELOID LEUKEMIA IN A GIRL WITH CELIAC DISEASE. *(E.)* Gupte, S. P.; Perkash, A.; Mahajan, C. M.; Aggarwal, P. K.; Gupta,

P. R. (Postgrad. Inst. of Med. Education and Res., Chandigarh, India). *Am. J. Dig. Dis.* 16(10):939-941, 1971.

0496 SMALL-BOWEL VOLVULUS, MALABSORPTION AND MUCOSAL DIAPHRAGM OF THE PYLORUS. *(E.)* Devroede, G.; Beaudry, R. (Centre Hospitalier Universitaire, Sherbrooke, Quebec, Canada). *Am. J. Dig. Dis.* 16(10):953-958, 1971.

0497 LACTOSE TOLERANCE IN A JEWISH POPULATION. *(E.)* Leichter, J. (Sch. Home Econ., Univ. British Columbia, Vancouver, Canada). *Am. J. Dig. Dis.* 16(12):1123-1126, 1971.

0498 CELLULAR AND HUMORAL SENSITIVITY TO GLUTEN FRACTIONS IN PATIENTS WITH TREATED NON-TROPICAL SPRUE. *(E.)* Morganroth, J.; Watson, D. W.; French, A. B. (Dept. Med., Univ. California, Davis). *Am. J. Dig. Dis.* 17(3):205-212, 1972.

0499 THE EFFECTS OF MEDIUM CHAIN TRIGLYCERIDES IN THE SHORT BOWEL SYNDROME. *(E.)* Tandon, R. K.; Rodgers, J. B.; Balint, J. A. (Dept. Med., Albany Med. Col. of Union Univ., Albany, N. Y.). *Am. J. Dig. Dis.* 17(3):233-238, 1972.

0500 EXOCRINE PANCREATIC FUNCTION IN INTESTINAL MALABSORPTION AND SMALL BOWEL DISEASE. *(E.)* Novis, B. H.; Bank, S.; Marks, I. N. (Groote Schuur Hosp., and the Dept. Med., Univ. Cape Town, S. Africa). *Am. J. Dig. Dis.* 17(6):489-494, 1972.

0501 LACTOSE MALABSORPTION AND STEATORRHEA. *(E.)* Ringrose, R. E.; Thompson, J. B.; Welsh, J. D. (Dept. Med., Univ. Oklahoma Med. Center and the Gastroenterol. Sec., VA Hosp. Okalahoma City). *Am. J. Dig. Dis.* 17(6):533-538, 1972.

0502 LACTOSE TOLERANCE IN A SLAVIC POPULATION. *(E.)* Leichter, J. (Sch. Home Econ., Univ. British Columbia, Vancouver, BC, Canada). *Am. J. Dig. Dis.* 17(1):73-76, 1972.

0503 THE TROPICAL INTESTINE. *(E.)* Anonymous. *Br. Med. J.* 1(5791):2-3, 1972.

0504 SUCROSE MALABSORPTION IN GREENLAND. *(E.)* McNair, A.; Gundmand-Hoyer, E.; Jarnum, S.; Orrild, L. (Med. Dept., Div. Gastroenterol., Rigshospital, DK-2100 Copenhagen, Denmark). *Br. Med. J.* 2(5804):19-21, 1972.

0505 LACTOSE MALABSORPTION IN SPANISH STUDENTS. III. THE CAPILLARY GLYCEMIC CURVE AFTER ORAL LACTOSE ADMINISTRATION IN CASES WITH POSITIVE RESPONSE TO THE INTESTINAL TOLERANCE TEST. *(Sp.)* Pena Yanez, A.; Pena Angulo, J. F.; Gil Extremera, B. (II Clinica Medica Univ. de Granada). *Rev. Esp. Enferm. Apar. Digest.* 37(4):421-446, 1972.

0506 FUNCTIONAL EXPLORATION OF THE SMALL INTESTINE. THE D-XYLOSE ABSORPTION TEST; ITS MODIFICATION FOR ROUTINE GASTROENTEROLOGY IN PEDIATRICS. *(Sp.)* Vernengo Lima, M. H.; Ortiz, J. P.; Striani, O. A.; Villar, O. A.; Knecht, E. (Hosp. Munic. Nino San Justo, Spain). *Rev. Esp. Enferm. Apar. Dig.* 37(3):347-352, 1972.

0507 DIARRHEA: CONCEPT, SYMPTOMATOLOGY, ETIOLOGY, PATHOGENESIS, AND TREATMENT. V. THE MALABSORPTION SYNDROME. DISEASES ASSOCIATED WITH MALABSORPTION, PHYSIOPATHOLOGY AND CLINICAL FEATURES. STEATORRHEA. *(Por.)* Campos, J. V. M. (Inst. Brasileiro Estudos Gastroent., Sao Paolo, Brazil). *Arq. Gastroenterol.* 9(1):25-34, 1972.

0508 STUDIES ON THE D-XYLOSE ABSORPTION TEST IN INFANTS: CAPILLARY BLOOD DETERMINATIONS. *(E.)* Toccalino, H.; Licastro, R. (Children's Hosp. Buenos Aires, Argentina). *Arq. Gastroenterol.* 9(1):21-24, 1972.

0509 CHROMATOGRAPHIC INVESTIGATION OF STOOL CARBOHYDRATES IN INFANTS, NORMALS AND WITH ACUTE DIARRHEA. *(E.)* Licastro, R.; Toccalino, H.; O'Donnell, J. C. (Alejandro Posadas Polyclinic, Buenos Aires, Argentina). *Acta Gastroenterol. Latinoamer.* 4(1):9-13, 1972.

0510 TROPICAL SPRUE. *(E.)* Baker, S. J. (Christian Med. Coll. Hosp. Vellore, Tamil Nadu, India). *Br. Med. Bull.* 28(1):87-91, 1972.

0511 MALABSORPTION IN ANKYLOSTOMIASIS. Nath, K.; Sur, B.K.; Samuel, K.C.; Gupta, B.K.; Mital, H.S.; Seth, O.N.; Saxena, S. (G.S.V.M. Med. Coll., Kanpur, India). *Indian J. Med. Res.* 59:1090-1098, 1971.

0512 INTESTINAL MALABSORPTION AND THE SKIN. *(Fr.)* Marks, J. (Roy. Victoria Infirmary, Newcastle upon Tyne, England). *Nouv. Presse Med.* 1(22):1479-1481, 1972.

0513 CARBOHYDRATE DIGESTION AND ABSORPTION. CLINICALLY SIGNIFICANT ABNORMALITIES. *(E.)* Olsen, W.A. (Vet. Admin. Hosp., Madison, Wis.). *Clin. Gastroenterol.* 51(4):149-152, 1972.

0514 FUNCTIONAL RESPONSE OF THE DIGESTIVE TRACT TO THE INGESTION OF MILK IN SUBJECTS SUFFERING FROM LACTOSE INTOLERANCE. *(E.)* Pirk, F.; Skala, I. (Inst. Hum. Nutr., Prague-Krc. Czechoslovakia). *Digestion* 5:89-99, 1972.

0515 STEATORRHEA. *(E.)* Rogers, A.I. (Univ. Miami Sch. Med., Miami, Fla.). *Postgrad. Med.* 50(6):123-129, 1971.

0516 THE FREQUENCY OF LACTOSE INTOLERANCE AMONG HEALTHY ADULTS IN GERMANY. *(Ger.)* Rotthauwe, H.W.; Emons, D.; Flatz, G. (Univ. Kinderklin., Bonn, West Germany.). *Dtsch. Med. Wochenschr.* 97:376-380, 1972.

0517 CLINICAL SYNDROME RESEMBLING TROPICAL SPRUE IN LIFELONG RESIDENTS OF TEMPERATE ZONE. *(E.)* Goldstein, F.; Dammin, G. J.; Mandle, R.J.; Wirts, C.W. (Lankenau Hosp., Philadelphia, Pa.). *Am. J. Dig. Dis.* 17(5):407-414, 1972.

0518 COELIAC DISEASE. *(E.)* Anderson, C.M.; Gracey, M.; Burke, V. (Inst. of Child Health, Univ. Birmingham, England). *Arch. Dis. Child.* 47(252):292-298, 1972.

0519 CONSTIPATION OF CHILDHOOD COELIAC DISEASE. *(E.)* Mitchell, B.E.; McNicholl, B. (Regional Hosp., Univ. Col., Galway, Eire). *Arch. Dis. Child.* 47(252):238-240, 1972.

0520 TRANSFERRIN AND *Straphylococcus aureus* IN KWASHIORKOR. *(E.)* McFarlane, H.; Okubadejo, M.; Reddy, S. (Dept. Chem. Pathol., Univ. Manchester, Manchester, England). *Am. J. Clin. Pathol.* 57(5):587-591, 1972.

0521 *PARA*-AMINOSALICYLIC ACID INDUCED MALABSORPTION. *(E.)* Longstreth, G.F.; Newcomer, A.D.; Westbrook, P.R. (Mayo Clinic, and Mayo Found., Rochester, Minn.). *Am. J. Dig. Dis.* 17(8):731-734, 1972.

0522 SUCROSE MALABSORPTION IN GREENLAND. *(E.)* McNair, A.; Gundmand-Hoyer, E.; Jarnum, S.; Orrild, L. (Med. Dept. P. Div. Gastroenterol., Rigshospitalet, DK-2100 Copenhagen, Denmark). *Br. Med. J.* 2(5804):19-21, 1972.

0523 FATS AND BILE SALTS. *(E.)* Holt, P.R. (Col. Physicians and Surg. Columbia Univ., New York City). *J. Am. Diet. Assoc.* 60:491-498, 1972.

0524 DIGESTIVE LOCALIZATIONS OF SCLERODERMA WITH MALABSORPTION. *(Fr.)* Le Parco, J.C.; Bader, J.P.; Martin, E.; Lambling, A. (Hop. A.-Chenevier, Creteil, France.). *Sem. Hop. Paris* 48(28):2057-2067, 1972.

0525 A CASE OF OSTEOMALACIA RELATED TO AN UNUSUAL MALABSORPTION MECHANISM IN THE COURSE OF A BLIND LOOP SYNDROME. *(Fr.)* de Seze, S.; Bernier, J.J.; Caroit, M.; Bordier, Ph.; Modigliani, R.; Rautureau, M.; Prost, A.; Rouaud, J.P. (Clin. Rhumat. Paris, France). *Rev. Rhum.* 39(4):297-303, 1972.

0526 ANOREXIA IN COELIAC SYNDROMES. *(Fr.)* Grenet, P.; de Paillerets, F.; Gallet, J.P.; Gubert, J.P.; Olivier, C. (Hop. Herold, Paris, France). *Ann. Pediatr. (Paris).* 19(6-7):491-497, 1972.

0527 OSTEOMALACIA AS A MANIFESTATION OF CELIAC DISEASE IN THE ADULT: SEVEN CASES. *(Fr.)* Prost. A.; Rambaud, J. C.; Miravet, L.; Bordier, P.; Hioco, D.; Paolaggi, J.; Camus, J. P.; Lievre, J. A.; de Seze, S.; Bernier, J. J. (Hop. St-Jacques, Paris, France). *Nouv. Presse Med.* 1(20):1329-1336, 1972.

0528 INTESTINAL XYLOSE ABSORPTION AS AFFECTED BY THE CONDITION OF THE SMALL INTESTINE. *(Ger.)* Dietze, F.; Laue, R.; Reitzig, P.; Schulz, H.J.; Wendlandt, H. (Karl-Marx-U., Leipzig, Germany). *Z. Ges. Inn. Med.* 27(11):467-470, 1972.

0529 MALABSORPTION AND CIRRHOSIS. *(Fr.)* Frexinos, J. (Groupe Recherches Path. Dig. Tolouse, France). *Rev. Med. Toulouse* 8(4):559-569, 1972.

0530 COELIAC DISEASE: GLIADIN INTOLERANCE. *(Fr.)* Francois, D.; Pouillaude, J.M.; Cret, L.; Neyron de St. Julien, Ch. (Fac. Med. Lyon, France). *Concours Med.* 94(20):3897-3910, 1972.

See also 0007, 0313, 0458, 0804, 0870

LARGE INTESTINE

0531 ZONAL COLONIC AGANGLIONOSIS, A VARIANT OF HIRSCHSPRUNG'S DISEASE. *(E.)* MacIver, A.G.; Whitehead, R. (Radcliffe Infirmary, Oxford, England). *Arch. Dis. Child.* 47(252):233-237, 1972.

In a review of 15 cases of Hirschsprung's disease of the colon 4 cases of an atypical variant were encountered. These 4 cases had a zone of aganglionosis of both intermyenteric and submucous plexuses in the sigmoid colon and, in 1 case, a further zone of aganglionosis in the rectum. Ganglion cells reappeared distal to the sigmoid zone of aganglionosis. A transition zone was not invariably present. The clinical features demonstrated a variability of presentation typical of the more usual form of the disease. The presence of zonal aganglionosis with normal ganglion cells distally supports the theory of craniocaudal migration of neuroblasts from the neural crest, indicating that neuroblast migration or development of double zonal aganglionosis should be kept in mind in cases of Hirschsprung's disease which respond poorly to operation.

0532 IMMUNOLOGICAL REACTIVITY IN PATIENTS WITH CARCINOMA OF COLON. *(E.)* Nairn, R. C.; Nind, A. P. P.; Guli, E. P. G.; Davies, D. J.; Roland, J. M.; McGiven, A. R.; Hughes, E. S. R. (Monash Univ. Med. Sch., Melbourne, Australia). *Br. Med. J.* 4(5789):706-709, 1971.

Sixty cases of colonic carcinoma were tested for antitumor immunoreactivity. The tests employed were blood lymphocyte reactivity and complement dependent serum cytotoxicity against tumor cells, and immunofluorescence for membrane staining of viable tumor cells and cytoplasmic staining of dried tumor cells in films. Nineteen cases were positive by one or more tests and the most frequent positive response, lymphocytotoxicity, was detected in eight of the 24 cases tested in this way. The lymphocytotoxicity persisted in a case tested three times over a year. Immunoreactivity against tumor cell surfaces, as by lymphocyte or serum cytotoxicity or membrane immunofluorescence, was restricted to colonic carcinomas but there was an additional element of individual specificity; no cross-reactivity with other tissues and tumors was observed. Lymphocytes from regional lymph nodes were non-reactive even in a case with positive blood lymphocyte cytotoxicity against the carcinoma cells.

0533 UNPROCESSED BRAN IN THE TREATMENT OF DIVERTICULAR DISEASE OF THE COLON. *(E.)* Painter, N.S.; Almeida, A.Z.; Colebourne, K.W. (Manor House Hospital, London, England). *Br. Med. J.* (7806):137-140, 1972.

Seventy patients with diverticular disease of the colon were treated with a high-residue, low-sugar diet including 3-45 g/day of unprocessed bran. Follow-up for an average of 22 months showed marked relief of symptoms in 62 patients. Bowel habit was restored towards normal and abdominal discomfort relieved. Only seven patients were unable to give up the use of laxatives. Eight patients did not tolerate the bran diet, and one of these needed surgical treatment. None of the diet needed surgery. Flatulence was initially noted by the majority of patients, but disappeared in 3-8 weeks. Upper gastrointestinal symptoms present in some patients were also alleviated.

0534 MULTIPLE ADENOCARCINOMAS OF THE COLON AND RECTUM. *(E.)* Travieso, Jr., C. R., Knoepp, Jr., L. F.; Hanley, P. H. (Clinica Luis Razetti, Caracas, Venezuela). *Dis. Colon Rectum* 15(1):1-6, 1972.

Multiple primary adenocarcinomas of the colon were found in 275 (12%) of 2230 colon carcinoma patients over a 19-year period. In the group with multiple carcinomas, 92 (4.1% of total) had second primary carcinomas in the colon or rectum; these included patients with familial polyposis with two primary neoplasms, patients with one carcinoma and one carcinoid, and many with early noninvasive carcinoma. Exclusion of these cases left 47 patients (2.1%) with multiple discrete invasive adenocarcinomas of the colon or rectum, either synchronous or metachronous. The gross five-year survival rates were 15% for both synchronous and metachronous carcinomas in this series, thus only slightly worse than the rate for single carcinomas. Only 2 of 34 synchronous carcinomas were completely missed. The survival rate can probably be improved by obtaining thorough preoperative studies, careful examination of the resected and remaining intestinal segments, and annual follow-up examinations.

0535 EXPERIMENTAL VENOUS LESIONS OF THE COLON. *(E.)* Marcuson, R.W.; Steward, J.O.; Marston, A. (Middlesex Hosp., London, England). *Gut* 13:1-7, 1972.

Experimental venous lesions in dogs were produced by simple ligation of the inferior mesenteric vein (5 cases) or by ligation followed by injection of thrombin solution between the ligatures. Only one severe lesion was produced by ligation alone, whereas ligation and thrombin injection resulted in seven severe, three moderate, and three minimal lesions, as revelaed by immediate postoperative sigmoidoscopy. The structural changes occurring in the colon after venous lesions differed from those after experimental arterial lesions, the former being characterized by congestive-type changes, and the latter by mucosal necrosis. Thus the arterial lesions appear to represent consecquences of ischemic hypoxia, and the venous loesions, of stagnant hypoxia. Marked increases in leukocyte counts and alkaline phosphatase levels were noted. The radiologic features of the colonic lesions correlated closely with the sigmoidoscopic appearances. Rapid resolution of the lesions in 11 dogs was followed by development of new venous channels in long-term survivors. Histological examination of apparently normal colon specimen from dogs with initially severe lesions after 6 weeks showed hemosiderin deposition in the colonic sub mucosa and in the regional mesenteric lymph nodes.

0536 CELLULAR IMMUNITY: POLYPS AND CARCINOMA OF THE COLON. SIGNIFICANCE OF THE LYMPHOCYTIC INFILTRATE. *(E.)* Sion, A.; Friedell, M.T. (Jackson Park Hospital, Chicago, Ill.). *Int. Surg.* 57(5):384-394, 1972.

The lymphocytic infiltrate in an around tumor tissue is of prognostic significance, as it may represent as an expression of an immunological response. This hypothesis was tested on a series of 117 cases of carcinoma of the colon seen since 1965, and on 54 recent cases of colonic polyps. In all benign polyps a lymphocytic infiltrate was easily demonstrated. In 97% of carcinomas, lymphocytic infiltrate was absent or sparse. In two cases, the inflammatory nature of the lesions precluded any assessment of lymphocytic infiltrate. Invasiveness of the tumor was also related to the degree of lymphocytic infiltrate. The deeper the invasion of the tumor, the less the lymphocytic infiltrate around the tumor cells. Nine cases of carcinoma of the colon with adjacent benigh polyps were seen. In all, the polyp showed abundant lymphocytic infiltrate while the carcinoma lacked this phenomenon.

0537 THE VALUE OF A STUDY OF THE MUCOSUBSTANCES IN RECTAL BIOPSIES FROM PATIENTS WITH CARCINOMA OF THE RECTUM AND LOWER SIGMOID IN THE DIAGNOSIS OF PREMALIGNANT MUCOSA. *(E.)* Filipe, M.I. (Westminster Med. Sch., London, England). *J. Clin. Pathol.* 25(2):123-128, 1972.

Rectal biopsies from 99 patients with carcinoma of the rectum or lower sigmoid colon were investigated using a high iron-diamine-Alcian blue technique for sulfated and non-sulfated acid mucins. In normal rectal mucosa sulfomucins are the main carbohydrate of the goblet cell mucin. This normal mucous pattern changes in the transitional mucosa (histologically normal mucosa adjacent to carcinoma) where there is an increase of non-sulfated acid mucins concomitantly with a decrease or absence of sulfated mucins were observed in the transitional mucosa surrounding adenomatous polyps and papilary adenomas; they were not marked in areas around carcinoma *in situ* and not observed in the metaplastic polyps. These changes seem to be in direct relationship to the grade of differentiation and invasiveness of the tumor. The histochemical changes in the mucins seem to be in favor of a malignant potential in the so-called neoplastic polyps. The high iron diamine-Alcian blue, because of its 'specificity', consistent results, and easy technique is recommended for routine use together with haematoxylin and eosin staining in the diagnosis of premalignant changes.

0538 RIGHT-SIDED COLONIC DIVERTICULA AS A CAUSE OF ACUTE RECTAL HEMORRHAGE. *(E.)* Casarella, W. J.; Kanter, I. E.; Seaman, W. B. (Columbia-Presbyterian Med. Cent., New York, N.Y.). *N. Engl. J. Med.* 286(9):450-453, 1972.

Twenty-seven patients with acute rectal hemorrhage studied by emergency selective arteriography; the bleeding point was demonstrated in 18. Fifteen of these were in the colon, and 13 were secondary to diverticulosis. Twelve of the offending diverticula were located to the right of the splenic flexure. Nine were in the ascending colon. Emergency arteriography was the only method that consistently demonstrated the bleeding point in these patients. The location of the majority of bleeding diverticula in the ascending colon weighs strongly against the use of emergency sigmoid colectomy in this group of patients.

0539 CORRECLATION BETWEEN SERUM ALPHA-GLOBULIN AND PLASMA INHIBITORY EFFECT ON PHA-STIMULATED LYMPHOCYTES IN COLON CANCER. *(E.)* Hsu, C.C.S.; LoGerfo, P. (Francis Delafield Hosp. Columbia Presbyterian Med. Cent., New York, N.Y.). *Proc. Soc. Exp. Biol. Med.* 139(2):575-578, 1972.

The effects of plasma from 15 early colon cancer patients and 15 normal individuals on lymphocytes response to phytohemagglutinin (PHA) were studied by testing on lymphocytes from a single donor in the same experiment. There was no statistical difference in plasma effects been the cancer and control groups. However, the plasma inhibitory effect tended to be more pronounced in patients with high serum carcino-embryonic antigen (CEA) levels, which are indicative of advance of disease. Serum 2-globulin level correlated with both plasma inhibitory effect and serum CEA levels, indicating that the plasma inhibitory factor also increases with advance of cancer. As suppressed lymphocyte response was related to increased 2-globulin, the plasma inhibitory effect may be caused by direct blocking of lymphocyte response to PHA by a tumor-produced factor or by increased production of 2-globulin stimulated by CEA.

0540 CARCINOID TUMOURS OF THE APPENDIX. *(E.)* Aho, A. J.; Heinonen, R. J.; Lauren, P. A. (Dept. Surg. University of Turku, Finland). *Acta Chir. Scand.* 137(8):801-806, 1971.

0541 HIRSCHSPRUNG'S DISEASE: A CLINICAL REVIEW. *(E.)* Davis, P. W.; Foster, D. B. E. (United Cardiff Hosp. Llandough, Penarth, Wales). *Brit. J. Surg.* 59(1):19-26, 1972.

0542 THE LESION OF THE SECOND CANCER OF THE LARGE BOWEL. *(E.)* Heald, R. J.; Lockhart-Mummery, H. E. (St. Mark's Hosp., London, England). *Br. J. Surg.* 59(1):16-19, 1972.

0543 UROLOGICAL COMPLICATIONS IN DIVERTICULITIS OF THE SIGMOID COLON. *(E.)* Madsen, C. M.; Thybo, E. (Odense Hosp., Odense, Denmark). *Acta Chir. Scand.* 138(2):207-210, 1972.

0544 ISCHEMIC COLITIS ASSOCIATED WITH A DEPOT SYNTHETIC PROGESTOGEN. *(E.)* Gelfand, M. D. (The Mason Clinic, Seattle, Wash.). *Am. J. Dig. Dis.* 17(3):275-277, 1972.

0545 BARIUM GRANULOMA OF THE RECTUM. *(E.)* Weitzner, S.; Law, D. H. (VA Hosp., Albuquerque, N.M.). *Am. J. Dig. Dis.* 17(1):17-22, 1972.

0546 RIGHT-SIDED DIVERTICULOSIS OF THE COLON. *(E.)* Perry, P. M.; Morson, B. C. (Roy. Postgrad. Med. Sch., London, England). *Br. J. Surg.* 58(12):902-904, 1971.

0547 A PILOT STUDY ON PREOPERATIVE IRRADIATION OF RECTOSIGMOID CARCINOMA. *(E.)* Allen, C. V.; Fletcher, W. S. (Univ. Oregon Med. Sch., Portland). *Am. J. Roentgenol.* 114(3):504-508, 1972.

0548 A VASCULAR CAUSE FOR AGANGLIONIC BOWEL: A NEW HYPOTHESIS. *(E.)* Earlam, R. J. (London Hosp., Whitechapel, London, England). *Am. J. Dig. Dis.* 17(3):255-261, 1972.

0549 PREOPERATIVE IRRADIATION OF RECTOSIGMOID CARCINOMA INCLUDING ITS REGIONAL LYMPH NODES. *(E.)* Kligerman, M. M.; Urdaneta, N. Knowlton, A.; Vidone, R.; Hartman, P. V.; Vera, R. (Yale Univ. Sch. Med., New Haven, Conn.). *Am. J. Roentgenol.* 114(3):498-503, 1972.

0550 MESENTERIC ANGIOGRAPHY IN PATIENTS WITH RADIATION INJURY OF THE BOWEL AFTER PELVIS IRRADIATION. *(E.)* Dencker, H.; Holmdahl, K. H. S.; Lunderquist, A.; Olivecrona, H.; Tylen, U. (Central County Hosp., Kalmar, Sweden). *Am. J. Roentgenol.* 114(3):476-81, 1972.

0551 MALIGNANT CONNECTIVE TISSUE TUMOURS OF THE COLON AND RECTUM. *(E.)* D'Onofrio, G.; Grassi, G. B., Jr. (Osp. S. Giovanni, Rome, Italy). *Chir. Gastroenterol.* 6(1):80-84, 1972.

0552 MANAGEMENT OF CANCER OF THE COLON, RECTUM AND ANAL CANAL (EXTENDED LYMPHOADENECTOMY). *(E.)* Cirenei, A. (Pio Ist. S. Spirito, Rome, Italy). *Chir. Gastroenterol.* 6(1):90-93, 1972.

0553 ACUTE APPENDICITIS IN A 15 MONTH OLD CHILD. *(E.)* Preyra, D. H.; Soldato, G. (A. Posadas Polyclinic, Haedo., Argentina). *Acta Gastroenterol. Latinoam.* 4(1):27-29, 1972.

0554 APPENDICITIS IN THE THIRD TRIMESTER OF PREGNANCY. MATERIAL AND FETAL PROBLEMS. *(Fr.)* Vitse, M.; Silberberg, L.; Boulanger, J. C. (Centre Hospitalo-Universitaire, Amiens, France). *J. Gyn. Obstet. Biol. Repr.* 1:223-229, 1972.

0555 FAMILIAL RECTAL PAIN. *(E.)* Dugan, R. E. (Vet. Admin. Hosp., Madison, Wis.). *Lancet* (7755):854, 1972.

0556 PREGNANCY AND TOXIC DILATATION OF THE COLON. *(E.)* Becker, I. M. (Evangelical Deaconess Hosp., Milwaukee, Wis.). *Am. J. Dig. Dis.* 17(1):79-84, 1972.

0557 HEREDITARY FAMILIAL DIFFUSE RECTO-COLIC POLYPOSIS. *(Sp.)* Curto Cardus, J.; Segarra Sans M.; Font Pascal, J. A. (Residencia Sanitaria Juan XXIII, Spain). *An. Med. (Barcelona)* 58(1):52-61, 1972.

0558 PLASMA-CELL DYSCRASIAS AND CARCINOMA OF THE COLON. Quemada Sisniega, J. M.; Arribas Castrillo, J. M. (Sanator. Quirurg. San Jose, Valladolid, Spain). *Rev. Esp. Enferm. Apar. Dig.* 37(3):353-366, 1972.

0559 SEGMENTAL STENOSIS OF THE SIGMOID. *(Sp.)* Miyar Gonzales, A. (Oviedo, Spain). *Rev. Esp. Enferm. Apar. Dig.* 37(2):229-240, 1972.

0560 LEIOMYOSARCOMA OF THE RECTUM. *(Sp.)* Curto Cardus, J. A.; Font Pascual, J. A.; Sans Segarra, M. (Residencia Sanitaria Juan XXIII, Tarragona, Spain). *Rev. Esp. Enf. Apar. Dig.* 37(2):211-218, 1972.

0561 STRANGULATION OF THE APPENDIX FROM CRURAL HERNIA. *(Sp.)* Capdevila-Torra, A.; Sierra Gil, E. (Univ. de Barcelona, Spain). *Rev. Esp. Enf. Apar. Dig.* 37(4):473-484, 1972.

0562 SIGMOID COLON RUPTURE FROM A FORCED TRANSANAL ENEMA. *(Sp.)* Otero Sendra, A. (Acad. Ciencias Med. de Cataluna y Baleares, Barcelona, Spain). *An. Med. (Barcelona)* 58(1):118-127, 1972.

0563 SPONTANEOUS EVISCERATION THROUGH A NEGLECTED LAPAROTOMY HERNIA. *(Sp.)* Llaurado-Miret, E.; Piulachs, X.; Laporte, E. (Acad. Ciencias Med. de Cataluna y Baleares, Barcelona, Spain). *An. Med. (Barcelona)* 58(1):146-152, 1972.

0564 THE SYNDROME OF ACUTE ENTERITIS WITH MECHANICAL ILEUS DURING HIRSCHSPRUNG'S DISEASE IN A NINETEEN-YEAR-OLD PATIENT. *(Pol.)* Kurasz, S.; Prokopowicz, D.; Karwowska, K. (Dept. Path. Anat., Bialystok Acad. Med., Bialystok, Poland). *Pol. Tyg. Lek.* 26(49):1910-1911, 1971.

0565 A CASE OF FAMILIAL COLONIC POLYPOSIS TREATED SURGICALLY. *(Pol.)* Hasik, J.; Roral, R.; Hryniewiecki, L.; Szymas, J. (Gastroenterology Clin., Inst. Int. Diseases, Poznan Acad. Med., Poznan, Poland). *Pol. Tyg. Lek.* 27(5):183-195, 1972.

0566 A CASE OF ACUTE APPENDICITIS TREATED SURGICALLY IN A PATIENT ON THE THIRD DAY AFTER MYOCARDIAL INFARCTION. *(Pol.)* Pawlik, A.; Woroniecka-Mazurkiewicz, A. (Dept. Gen. Surg. Gdansk, Poland). *Pol. Tyg. Lek.* 26(43):1675-1676, 1971.

0567 DIVERTICULAR DISEASE OF THE COLON: A DEFICIENCY DISEASE OF WESTERN CIVILISATION AND ITS TREATMENT BY A HIGH RESIDUE DIET. *(E.)*

Painter, N. S. (The Manor House Hosp., London). *Rendic. Gastroenterol.* 4:35-45, 1972.

0568 UNUSUAL ARTERIAL IMPRESSIONS UPON THE DUODENUM. *(E.)* Shimkin, P.M., Pearson, K. D. (The Clinical Center, Natl. Inst. Health, Bethesda, Md.). *Radiology* 103(2):295-297, 1972.

0569 CURRENT KNOWLEDGE OF DIVERTICULAR DISEASE OF THE COLON. *(E.)* Berman, P.M., Kirsner, J.B. (Dept. Med., Univ. Chicago, Chicago, Ill.). *Am. J. Dig. Dis.* 17(8):741-760, 1972.

0570 CYTOLOGY OF RECTOSIGMOID DISEASE USING THE REPLICA METHOD. *(E.)* Lawoyin, V., Anselm, K. (Div. Gastroenterol., Dept. Med.,). *Henry Ford Hosp. Med. J.* 20(1):15-18, 1972.

0571 DIET AND COLONIC DISEASE. *(E.)* Goldstein, F. (Lankenau Hosp., and Jefferson Med. Col. Philadelphia, Pa.). *J. Am. Diet. Assoc.* 60:499-503, 1972.

0572 COLONIC OBSTRUCTION DUE TO A GALLSTONE. *(E.)* Brown, C. (Royal Free Hosp, London.). *Br. J. Clin. Pract.* 26(4):175-177, 1972.

0573 PRESENT PROBLEMS OF ACUTE APPENDICITIS. *(E.)* Jones, F. C., Martin, J.D., Jr. (Dept. Surg., Emory Univ. Sch. Med., Atlanta, Ga.). *Am. Surg.* 38(5):247-250, 1972.

0574 INTESTINAL ISCHAEMIA. *(E.)* Anonymous. *Br. Med. J.* (5804):3, 1972.

0575 COLONIC LYMPHANGIECTASIA: REPORT OF TWO CASES. *(E.)* Griffen, W. O., Belin, R. P.; Furman, R. W.; Lieber, A.; Schaefer, J. W.; Dubilier, L. D. (Univ. Ky. Coll. Med., Lexington, Ky.) *Dis. Colon Rectum* 15(1):49-54, 1972.

0576 SIGMOIDOVAGINAL AND CECOVAGINAL FISTULA AS A COMPLICATION OF PERIDIVERTICULITIS: REPORT OF EIGHT CASES. *(E.)* Bacon, H. E., Ross, S. T.; Malvar, P. (Philadelphia, Pa.) *Dis. Colon Rectum* 15(1):41-48, 1972.

0577 CRYOSURGICAL HEMORRHOIDECTOMY: A FOLLOW-UP REPORT. *(E.)* Lewis, M. I. (Dep. Surg. Colon Rectal Surg., Queen Angels Hosp., Los Angeles, Calif.) *Dis. Colon Rectum* 15(2):128-134, 1972.

0578 NEWER CONCEPTS OF CANCER OF THE COLON AND RECTUM: CELLULAR IMMUNITY TO HUMAN COLONIC CARCINOMAS. *(E.)* Hellstroem, I., Hellstroem, K. E. (Univ. Washington Med. Sch., Seattle). *Dis. Colon Rectum,* 15(2):100-105, 1972.

0579 NEWER CONCEPTS OF CANCER OF THE COLON AND RECTUM: SIMILARITIES BETWEEN HUMAN AND EXPERIMENTALLY INDUCED TUMORS OF THE LARGE INTESTINE. *(E.)* Spjut, H. J. (Dep. Pathol., Baylor Coll. Med., Houston, Tex.) *Dis. Colon Rectum* 15(2):94-99, 1972.

0580 NEWER CONCEPTS OF CANCER OF THE COLON AND RECTUM: DELAYED HYPERSENSITIVITY RESPONSES OF PATIENTS WITH CARCINOMA OF THE COLON AND OTHER SOLID TUMORS. *(E.)* Kronman, B. S., Shapiro, H. M.; Localio, S. A. (Coll. Phys. Surg. Columbia Univ., Presbyterian Hosp. New York, N. Y.) *Dis. Colon Rectum* 15(2):106-110, 1972.

0581 NEWER CONCEPTS OF CANCER OF THE COLON AND RECTUM: IMMUNOTHERAPY FOR PATIENTS WITH CANCER OF THE LARGE INTESTINE. *(E.)* Griffen, W. O., Jewell, W. R.; Meeker, W. R.; Humphrey, L. J. (Univ. Kentucky Coll. Med., Lexington). *Dis. Colon Rectum* 15(2):116-119, 1972.

0582 NEWER CONCEPTS OF CANCER OF THE COLON AND RECTUM: CELL KINETICS, CHEMOTHERAPY, AND COLONIC CANCER. *(E.)* Johnson, Turnbull; Hellstroem; Spjut; Griffen; Kronman; LeBel; Remington. *Dis. Colon Rectum* 15(2):120-127, 1972.

0583 ISCHEMIC COLITIS (MARSTON TYPE). ANATOMO-PATHOGENIC STUDY, BASED ON SIX CASES. *(Fr.)* Le Capon, J., Galian, A.; Potet, F. (Serv. Anat. Pathol., Hop. Beaujon, Clichy, France.) *Sem. Hop. Paris* 48(15):1039-1048, 1972.

0584 PROTECTION OF TISSUES IN HIGH-DOSE RADIATION THERAPY. TREATMENT WITH TRIAMCILINOLONE IN LARGE INTESTINE REACTIONS. *(Ger.)* Blumenberg, F.-W.; Hoffer-Janker, H. (Strahlenklin. Janker, Bonn, Germany). *Radiologe* 12(7):209-210, 1972.

0585 LIPOMA OF THE COLON. *(Fr.)* Payet, M., Thierree, R. -A.; Tod, R. (Hop. Cl. - Bernard, Paris, France) *Sem. Hop. (Paris)* 48(29):2125-2129, 1972.

0586 EXPERIENCE WITH A NEW DRUG [LASONIL-H] IN THE MANAGEMENT OF THE ANORECTAL VARICOSIS SYNDROME. *(It.)* Bottero, G., Slaviero, G. (Osp. Ca' Granor Milano, Milan Italy). *Minerva Med.,* 63(43):2431-2437, 1972.

0587 EXTERNAL FISTULA OF THE COLON CAUSED BY A BROKEN TOOTH. *(Dut.)* Soer, J. R., Den, Otter, G. (Vrije U. Amsterdam, Netherlands). *Nederl. T. Geneesk.* 116(16):638-641, 1972.

0588 DIVERTICULITIS OF THE APPENDIX. A STUDY OF 61 CASES. *(Fr.)* Deschenes, L., Couture, J.; Bujold, R.; Garneau, R. (Hop. Saint - Sacrement Quebec, Canada). *Chirurgie* 98(6);370-376, 1972.

0589 DUODENO-SIGMOID FISTULA FROM CANCER OF THE RIGHT COLON. *(Fr.)* Gautier - Benoit, C., Chambon, J. - P. (Central Hosp., Lens, France). *Chirurgie* 98(7):433-436, 1972.

0590 RETRORECTAL AND TRANSANAL LOWERING OF THE COLON IN RECTO-SIGMOID SURGERY. *(DUHAMEL'S OPERATION)*. *(Fr.)* Sicard, J. -L., Chatelin, C. -L. (Ctre Hosp. Princesse Grace, Monaco). *J. Chir. (Paris)* 103(4):353-366, 1972.

0591 ANORECTAL SPHINCTER STIMULATOR IN THE MANAGEMENT OF ANAL INCONTINENCE PRINCIPLE, METHOD, AND RESULTS FROM FORTY OBSERVATIONS. *(Fr.)* Colin, R. (Clin. St-Eloi, Montpellier, France). *Chirurgie* 98(8):502-507, 1972.

0592 INTESTINAL FISTULAS AFTER APPENDECTOMY. *(Rus.)* Malyugina, T. A., Bognitskaya, T. N. (N. V. Sklifosovskiy Res. Inst. Emergency, Moscow, USSR). *Vestn. Khir.* 103(1):117-122, 1972. 122, 1972.

0593 MORTALITY CAUSES AMONG ACUTE APPENDICITIS PATIENTS. *(Rus.)* Tatevosyan, A. S.; Grigor'yev, A. F.; Komissarov, B. P.; Bardymov, V. M. (I. M. Sechenov Med. Inst., Moscow, USSR). *Vestn. Khir.* 103(1):112-116, 1972.

0594 ECTOPIC GASTRIC MUCOSA AND GLANDULAR TISSUE OF A SALIVARY TYPE IN THE ANAL CANAL CONCOMITANT WITH A DIVERTICULUM IN HEMORRHOIDAL TISSUE: REPORT OF A CASE. *(E.)* Shindo, K., Bacon, H. E.; Holmes, E. J. (P. L. Hosp., Osaka-Fu, Japan.) *Dis. Colon Rectum* 15(1):57-62, 1972.

0595 DIAGNOSIS AND TREATMENT OF CONGENTIAL ANOMALIES OF THE ANUS AND RECTUM. *(E.)* Tank, E. S. (Dep. Surg., Univ. Mich. Med. Center, Ann Arbor, Mich.) *Dis. Colon Rectum* 15(2):135-141, 1972.

0596 THE PROBABLE IMMUNOLOGICAL ROLE OF REGIONAL LYMPH NODES IN SIMULATED COLON CARCINOMA IN THE RABBIT. *(E.)* Hall, M. G., Chung, E. B.; Leffall, L. D. (Freedman's Hosp., Washington, D. C.) *J. Natl. Med. Assoc.* 64(2):102-105,144, 1972.

0597 STUDIES ON ULCERATIVE LESIONS OF THE INTESTINE IN NEWBORNS AND INFANTS. *(Jap.)* Takahashi, H. (1st Dep. Surg., Nagoya City Univ. Med. Sch., Nagoya, Japan). *J. Nagoya City Med. Assoc.* 22(4):422-453, 1972.

0598 ISCHEMIC COLITIS. *(E.)* Ross, S. T. (Garden City, New York). *Postgrad. Med.* 51(4):71-74, 1972.

0599 A NEW SYNTHETIC VEIN MEDICATION COMPOUND IN PROCTOLOGY. *(Fr.)* Berson, I. (Clin. Univ. Dermato-Venereol., Lausanne, Switz). *Praxis* 61(2):52-54, 1972.

0600 RADIOGRAPHIC FINDINGS IN ACUTE APPENDICITIS. *(E.)* Rulfs, D. M., Fisher, R. G. (Dep. Radiol., Baylor Coll. Med., Tex. Med. Center., Houston, Tex). *Tex. Med.* 67(89-93, 1971.

0601 THE EXTENT OF ELECTROLYTE LOSS IN VILLOUS RECTAL ADENOMA. *(E.)* Elsner, I., Werner, G. (Chirurg. Klin. Med. Akad. Erfurt, Erfurt, Germany). *Z. Inn. Med.* 26(20):664-665, 1971.

See also 0182, 0206, 0408, 0433, 0434, 0441, 0461, 0464, 0467, 0468, 0482, 0599, 0840, 0847, 0864, 0867, 0868, 0869, 0882, 0899, 0902, 0903, 0904

LARGE INTESTINE

Ulcerative Colitis

0602 INFLAMMATORY BOWEL DISEASE. THE ROLE OF LYMPHOTOXIN IN THE CYTOTOXICITY OF LYMPHOCYTES FOR COLONIC EPITHELIAL CELLS. *(E.)* Shorter, R. G., Huizenga, K. A.; Spencer, R. J.; Guy, S. K. (Mayo Clinic, Rochester, Minn.). *Am. J. Dig. Dis.* 17(8):689-695, 1972.

The cytotoxic and physicochemical properties of cell-free supernatants, derived either from incubates of lymphocytes from patients with chronic ulcerative colitis or Crohn's disease of the colon (inflammatory bowel disease) with colonic epithelial cells or from incubates of colonic epithelial cells with normal lymphocytes pretreated with inflammatory bowel disease serum (cytophilic antibody), were studied. These cell-free supernatants were cytotoxic for various human and murine tissue cells; their cytotoxicities and physicochemical properties conformed to those of human lymphotoxin from stimulated (phytohemagglutinin-P) human lymphocytes. Thus the cytotoxicity of inflammatory bowel disease lymphocytes for colonic epithelial cells appears to involve a specific recognition mechanism, possibly mediated by cytophilic antibody. However, the actual destruction of target cells is nonspecific and is effected by the release of lymphotoxic factor which is triggered by the recognition mechanism.

0603 AZATHIOPRINE IN ULCERATIVE COLITIS: AN INTERIM REPORT ON A CONTROLLED THERAPEUTIC TRIAL. *(E.)* Jewell, D. P.; Truelove, S. C. (Radcliffe Infirmary, Oxford, England). *Br. Med. J.* 1:709-712, 1972.

Results of studies on the first 40 patients in a controlled therapeutic trial of azathioprine in ulcerative colitis to complete a one-year maintenance period on drug or placebo are presented. All patients had classical ulcerative colitis and were in an actual attack of the disease at the time of admission. The attack was treated with a standard corticosteroid regimen and the patients were assigned at random to maintenance treatment with real or dummy azathioprine tablets, using a stratified design. The treatment and control groups were closely similar at the beginning of the trial. The effects of treatment were assessed via the number of relapses during the one-year trial period, the sigmoidoscopic picture, and the histological findings on serial rectal biopsy. In the patients receiving azathioprine the disease ran a more favorable course than in the control group. After the attack had been treated, 11 of the 20 patients on azathioprine were symptom-free throughout the rest of the trial period, compared with 5 out of 20 in the control group. The three patients classed as failures were all in the control group. These differences just fail to reach conventional levels of statistical significance. Azathioprine may be a useful addition to the medical treatment of ulcerative colitis, particularly if conventional treatment is ineffective, and at the dose used was virtually free from side effects.

0604 PATHOLOGY OF ULCERATIVE COLITIS. *(E.)* Morson, B. C. (St. Mark's Hosp., London, England). *Rend. Gastroenterol.* 3:183-193, 1971.

0605 A COMPARISON OF THE MOTILITY IN IRRITABLE COLON SYNDROME AND DIVERTICULAR DISEASE OF THE COLON. *(E.)* Parks, T. C.; Connell, A. M. (Dep. Surg. Inst. Clin. Sci., Queen's Univ., Belfast, No. Ireland). *Rend. Gastroenterol.* 4:12-17, 1972.

0606 BENIGN INTRACRANIAL HYPERTENSION AND ULCERATIVE COLITIS. *(E.)* Jewel, D. P.; Truelove, S. C. (Radcliffe Infirmary, Oxford, England). *Am. J. Dig. Dis.* 17(1):89-91, 1972.

0607 LONG TERM THERAPY OF ULCERATIVE COLITIS WITH 6-MERCAPTOPURINE: A PERSONAL SERIES. *(E.)* Korelitz, B. I.; Wisch, N. (Mt. Sinai Hosp., New York, N. Y.). *Am. J. Dig. Dis.* 17(2):111-118, 1972.

0608 COLON ANTIBODIES AND LIVER DISEASE IN ULCERATIVE COLITIS. *(E.)* Marcussen, H. (Rigshosp., Copenhagen, Denmark). *Lancet* (7751): 632, 1972.

0609 AT THE BORDERLINE OF ULCERO-HAEMORRHAGIC RECTOCOLITIS AND CROHN'S DISEASE. *(Fr.)* Elewaut, A.; Mussche, M.; Demeulenaire, L.; Barbier, F. (Serv. Gastro-ent., Akad. Ziekenhuis, Gent, Belgium). *Acta Gastroenterol. Belg.* 34(12):807-818, 1971.

0610 PERIMUSCULAR EXCISION OF THE RECTUM FOR CROHN'S DISEASE AND ULCERATIVE COLITIS. A CONSERVATION TECHNIQUE. *(E.)* Lee, E. C. G.; Dowling, B. L. (Radcliffe Infirmary, Oxford, England). *Br. J. Surg.* 39(1):29-32, 1972.

0611 CROHN'S DISEASE OF THE LARGE BOWEL. *(E.)* Anonymous. *Br. Med. J.* (5793):125-126, 1972.

0612 TOXIC COLON COMPLICATING ULCERATIVE COLITIS. REPORT OF 9 CASES. *(Pol.)* Narebski, J.; Jakubowska, K. (Clin. Inf. Dis. Warsaw Acad. Med., Warsaw, Poland). *Pol. Tyg. Lek.* 26(42):1625-1628, 1971.

0613 CYCLOPHRENIA WITH PSYCHOSOMATIC MANIFESTATIONS OF THE SPASTIC COLITIS TYPE PREVAILING IN THE CLINICAL PICTURE. *(Pol.)* Slabowicz, J. W. (Clin. Psychiat. Dis. Gdansk Acad. Med., Gdansk, Poland). *Pol. Tyg. Lek.* 27(4):151-152, 1972.

0614 A CASE OF CROHN'S DISEASE OF THE COLON. *(Fr.)* Hartemann, E.; Chazalette, J. P.; Chavrier, Y. (Hop. Renee Sabran, Lyon, France). *Pediatrie* 27(1):49-54, 1972.

0615 AUTOIMMUNE FEATURES OF ULCERATIVE COLITIS. THERAPEUTICAL ATTEMPTS WITH THE ^{35}S-RADIOISOTOPE. *(Hun.)* Szabo, T. (Debrecen Med. U., Debrechen, Hungary). *Magy. Belorv. Arch.* 25(2): 75-80, 1972.

0616 EMERGING CONCEPTS OF PROCTOSIGMOIDITIS. Farmer, R.G.; Brown, C.H. (Dep. Gastroenterol., Cleveland Clin. Found., Cleveland, Ohio.). *Dis. Colon Rectum* 15(2):142-146, 1972.

0617 DIFFERENTIAL DIAGNOSIS OF NONSPECIFIC AND AMEBIC ULCERATIVE COLITIS: SURVEY OF 100 PATIENTS. Pardo-Gilbert, A; Perez-Alvarado, N.; Zavala, B. (Inst. Nac. Nutr., Mexico City, Mex.). *Dis. Colon Rectum* 15(2):147-149, 1972.

See also 0247, 0483, 0858

0618 EFFECT OF VAGOTOMY AND PYLOROPLASTY ON PANCREATIC DOSE-RESPONSE CURVES TO SECRETIN IN MAN. *(E.)* Konturek, S.J.; Popiela, T.; Thor, P. (Inst. Physiol. Medical Academy, Krakow, Poland). *Am. J. Dig. Dis.* 16(12):1087-1090, 1972.

Pancreatic dose-response curves to secretin were obtained for six duodenal ulcer patients before and after vagotomy and pyloroplasty. Pancreatic secretion was determined by successively increasing the dose rate of secretin infused intravenously from 0.1-3.6 units/kg/hr. The shape of the dose-response curves for pancreatic volume flow and bicarbonate output before vagotomy and pyloroplasty was similar to the shape of the curves obtained after surgery. This suggests that the integrity of vagal nerves is not of major importance in the response of the pancreas to exogenous secretin.

0619 TRAUMATIC PSEUDOCYSTS OF THE PANCREAS. A REPORT OF TEN CASES. *(E.)* Trucker, P. C.; Webster, P. D. (Med. Coll. Georgia, Augusta). *Arch. Intern. Med.* 129(4):583-586, 1972.

0620 PANCREATIC TRANSPLANTATION. *(E.)* Anonymous. *Br. Med. J.* 1(5796):326-327, 1972.

0621 NOTES ON THE SEMEIOLOGY OF THE SURGICAL DISEASES OF THE PANCREAS. *(E.)* Battistini, C.; Dell'Anna, B. (Inst. Surg. Spec. Pathol. Elem. Clin. Educ., Univ. Parma, Italy). *Chir. Gastroenterol* 6(1):37-54, 1972.

0622 CARCINOMA OF THE PANCREAS. DIAGNOSTIC AND THERAPEUTIC PROBLEMS. *(Ger.)* Peiper, H.-J. (Klin. Poliklin. Allgemeinchir. Univ. Goettingen, Germany). *Leber Magen Darm* 2(3):95-104, 1972.

0623 PSUDOCYSTS OF THE PANCREAS. *(Sp.)* Puente Dominguez, J. L.; Potel Lesquereux, J. (Santiago de Compostela Fac. Med.). *Rev. Esp. Enferm. Apar. Dig.* 36(5):491-506, 1972.

0624 DIAGNOSTICS OF EXOCRINE PANCREAS FUNCTION. *(Ger.)* Domschke, W.; Goebell, H.; Rick, W.; Ammann, R.; Kapp, F.; Schmidt, H.; Bergner, D.; Classen, M.; Demling, L. (Med. Univ., Erlangen, West Germany). *Leber Magen Darm* 2(3):91-92, 1972.

0625 THE INFLUENCE OF APROTININ (TRASYLOL) ON EXPERIMENTAL ACUTE NECROSIS OF THE PANCREAS IN RATS. *(E.)* Dembinska-Kiec, A. (Dep. Pharmacol., Med. Acad., Cracow, Poland). *Acta Med. Pol.* 13(1):1-28, 1972.

0626 CARCINOMA OF THE PANCREAS ARISING IN THE REGION OF THE UNCINATE PROCESS. *(E.)* Suzuki, T.; Kuratsuka, H.; Uchida, K.; Matsumoto, Y.; Honjo, I. (First Dep. Surg., Kyoto Univ. Med. Sch., Kyoto, Japan). *Cancer* 30(3):796-800, 1972.

0627 CARCINOMA OF THE PANCREAS IN UGANDA- A CASE REPORT. *(E.)* James, P. D. (Dep. Pathol., Makerere Univ. Med. Sch., Kampala, Uganda). *East Afr. Med. J.* 48(12):699-707, 1971.

0628 BLOOD LIVER CONCENTRATIONS OF VITAMINS A AND E IN CHILDREN WITH CYSTIC FIBROSIS OF THE PANCREAS. *(E.)* Underwood, B. A.; Denning, C. R. (Inst. Hum. Nutr., Dep. Pediat., Coll. Phys. and Surg., Columbia Univ., N.Y., N.Y.). *Pediatr. Res.* 6(1):26-31, 1972.

0629 SELECTIVE ARTERIOGRAPHY IN PANCREATIC TRAUMA. *(E.)* Blery, M.; Etienne, J.; Farah, A.; Bismuth, V. (Serv. Radiol., Hop. Ambroise-Pare, Boulogne, France). *Sem. Hop. Paris* 48(7):473-479, 1972.

0630 CANCER OF THE PANCREAS. CLINICAL FORMS. *(Fr.)* Reboul, M. (no affil.). *Gaz. Med. France* 79(17):2955-2961, 1972.

0631 CYSTADENOMA OF THE PANCREAS. *(Rus.)* Tseylikman, E. G.; Mel'nikov, D. N. (Chelyabinsk Reg. Oncol. Ctr., Chelyabinsk, USSR). *Vop. Onkol.* 18(2):87-88, 1972.

0632 MULTIPLE ENDOCRINE ADENOMATOSIS. PRESENCE OF PANCREATIC TUMOR WITH AMYLOID STROMA. IN ONE CASE. *(Fr.)* Dry, J.; Roland, J.; Bourdarias, J.; Holler, A.; Harlay, A. (Hop. Sainst-Antoine, Paris, France). *Nouv. Presse Med.* 1(20):1341-1345, 1972.

0633 HIDDEN ISOLATED INJURY OF THE PANCREAS IN A CHILD. *(Hun.)* Zathureczky, G.; Molnar, G.; Sartory, L. (Dunaujvaros City Cocl. Hosp. Dunaujvaros, Hungary). *Orv. Hetil.* 113(115):882-223, 1972.

See also 0009, 0205, 0206, 0209, 0215, 0227, 0235, 0236, 0237, 0238, 0239, 0346, 0456, 0459, 0475, 0488, 0843

PANCREAS

Pancreatitis

0634 ACQUIRED BISALBUMINEMIA WITH HYPERAMYLASEMIA. *(E.)* Shashaty, G. G.; Atamer, M. A.; Shields, E. (Grasslands Hosp., Valhalla, NY). *Am. J. Dig. Dis.* 17(1):59-67, 1972.

Electrophoretic patterns of serum from two patients with pancreatitis and hyperamylasemia displayed an acquired double albumin, with the anomalous albumin migrating more rapidly than the normal. The rapidly migrating fraction appeared to be directly related to the serum amylase level, both quantitatively and chronalogically. No immunologic differences were detectable between the two albumins. The elevated serum amylase level was not apparently ca caused by macroamylasemia. Possible mechanisms for the production of double albumin include: amylase to albumin binding, an enzymatic change of albumin by amylase, or the presence in serum of other substances that alter the electric charge of albumin.

0635 FUNCTIONAL INVESTIGATION OF THE EXOCRINE PANCREAS FOLLOWING ACUTE PANCREATITIS. *(E.)* Gullo, L.; Sarles, H.; Mott, C. B. (INSERM Res. Unit on Dig. Dis., Marseille, France). *Rendic. Gastroenterol.* 4:18-21, 1972.

Pancreatic function was studied in twenty-seven patients who had suffered from acute pancreatitis from three months to more than a year after the attack. Concentrations of bicarbonates, amylase, lipase, phospholipase, trypsin and chymotrypsin were measured in the duodenal aspirates after a secretin-pancreozymin test. There was no significant difference between the results of the thirty-one investigations relating to these twenty-seven patients and those obtained for the one hundred normal subjects. The number of individual parameters falling below the lower statistical limit of the normal value decreased over time. "Restitutio ad integrum" of the exocrine function of the pancreas seems therefore to be usual after pancreatitis.

0636 ACUTE PANCREATITIS ASSOCIATED WITH RECURRENT PYOGENIC CHOLANGITIS. *(E.)* Ong, G. B.; Adiseshiah, M.; Leong, C. H. (Univ. Hong Kong, Queen Mary Hosp.). *Br. J. Surg.* 58(12):891-894, 1971.

0637 CORTISONE IN THE TREATMENT OF ACUTE PANCREATITIS (CLINICAL AND EXPERIMENTAL STUDY). *(E.)* Bonomo, G. M.; Nacchiero, M. (Dep. Dig. Surg., Univ. Bari, Italy). *Chir. Gastroenterol.* 6(2):149-159, 1972.

0638 ACUTE HEMORRHAGIC PANCREATITIS ASSOCIATED WITH DECOMPENSATED CHRONIC RESPIRATORY INSUFFICIENCY. *(E.)* Paulet, P.; Thys, J. P.; Lewinson, H.; Thys, O.; Cornil, A. (Hop. Univ. St.-Pierre, Brussels, Belgium). *Acta Gastroenterol. Belg.* 34(12):819-824, 1971.

0639 THE ETIOLOGY OF PANCREATITIS. *(E.)* Geeverghese, P. J. (Med. Coll., Calicut, India). *J. Assoc. Physicians India* 19(6):413-415, 1971.

0640 ACUTE PANCREATITIS IN CHILDREN. *(E.)* Moossa, A. R. (Liverpool Roy, Infirmary, England). *Lancet* (7751):638, 1972.

0641 GASTROINTESTINAL BLEEDING IN PANCREATITIS. *(E.)* Cotton, P. B.; Negus, D.; Browse, N. L.; Beales, J. S. M.; Reid, D. J. (St. Thomas's Hosp., London, England). *Lancet* (7755):847, 1972.

0642 OBSERVATIONS ON THE DIAGNOSIS OF ACUTE AND CHRONIC RELAPSING PANCREATITIS. *(E.)* Scuro, L. A.; Dobrilla, G.; Cavallini, G.; Angelini, G.; Vantini, I. (Inst. Med. Pathol., Univ. Padova, Verona, Italy). *Chir. Gastroenterol.* 5(4):483-492,1971.

0643 ACUTE PANCREATITIS: REVIEW OF 102 CASES. *(Sp.)* Perez, J. G.; Mirada, A.; Foz, M.; Castells, E.; Burgui, J. L. F. (Ciudad Sanit. Seguridad Soc. Barcelona, Barcelona, Spain). *Med. Clin.* 58(2):113-117, 1972.

0644 ACUTE PANCREATITIS AND DIABETIC COMA. A REVIEW AND TWO CASES. *(Dan.)* Romer, F. K. (Centralsygehuset, Holstebro, Denmark). *Ugeskr. Laeger* 133(39):1920-23, 1971.

0645 TREATMENT OF ACUTE PANCREATITIS AND CHOLECYSTOPANCREATITIS WITH TRASYLOL. *(Rus.)* Shabanov, A. N.; Mikeladze, K. D. (I. M. Sechenov Med. Inst., Moscow, USSR). *Vestn. Khir.* 103(1):41-44, 1972.

0646 PANCREATITIS IN INTERNAL MEDICINE. *(Fr.)* Feydit, P.; Christoforov, B.; Guerre, J. Pequignot, H.; Schaeffer, A. (Hop. Cochin, Paris, France). *Sem. Hop. (Paris)* 48(30):2169-2173, 1972.

0647 OBSTRUCTIVE JAUNDICE, CHRONIC PANCREATITIS, AND DUODENAL STENOSIS. AN UNUSUAL COMBINATION IN THE CHILD. *(Fr.)* Alagille, D.; Carlioz, H.; Courtecuisse, V.; Thron, Ph.; Bassoyan, J. (Hop. Parrot, Bicetre, France). *Arch. Fr. Pediatr.* 29(4):421-429, 1972.

0648 WIRSUNG'S DUCT PERFORATION OCCURRING IN CHRONIC CALCIFYING PANCREATITIS. CASE REPORT. *(Fr.)* Sarles, J.-C.; Giuly, J.; Houze, J.-P. (Clin. Chir. Hotel Dieu, Marseille, France). *Nouv. Presse Med.* 1(26):1777-1780, 1972.

0649 THE PANCREATIC DUCT IN CHRONIC PANCREATITIS. *(Fr.)* Roux, M.; Vayre, M.; Simon, Ph.; Kron, B. (Hop. Vaugirard, Paris, France). *J. Chir. (Paris)* 103(4):321-334, 1972.

See also 0093, 0198, 0205, 0235, 0236, 0237, 0238, 0621, 0870

LIVER AND BILIARY TRACT

0650 INTESTINAL ALKALINE PHOSPHATASE IN PATIENTS WITH LIVER DISEASE. *(E.)* Barakat, M.; Grubb, M. N.; Goyal, R. K.; Hersh, T. (Baylor Coll. of Med., Houston, Tex.). *Am. J. Dig. Dis.* 16(12): 1102-1106, 1972.

The isoenzymes of alkaline phosphatase were separated, using polyacrylamide gel electrophoresis. In some patients with liver disease, two isoenzymes of alkaline phosphatase were detected--one corresponding to the liver and the other, to the intestinal fraction. The intestinal band was observed in the fasting sera in 17 of 51 patients with nutritional cirrhosis and in 6 of 14 with chronic active hepatitis. Intestinal isoenzyme was not found, however, in the fasting sera of 23 patients with viral hepatitis, 16 with metastatic disease to the liver, 11 with obstructive jaundice or 33 healthy volunteers. The presence of intestinal isoenzyme was not related to the value of total serum phosphatase activity.

0651 HEPATIC DEGENERATION AND DYSFUNCTION IN REYE'S SYNDROME. *(E.)* Brown, R. E.; Madge, G. E. (Med. Coll. of Va., Richmond). *Am. J. Dig. Dis.* 16(12):1116-1122, 1971.

Case histories were available on 6 patients who presented with the clinical features of vomiting and encephalopathy and, pathologically, with fatty accumulation in the viscera--the cardinal features of Reye's syndrome. An attempt was made to correlate hepatocyte degeneration and associated dysfunction in these patients. The degenerative changes consisted of varying degrees of hepatocytolysis and cellular swelling with obliteration of the sinusoidal architecture. Small-droplet fatty accumulation in hepatocytes was demonstrated by oil red O staining. Concurrent with this was evidence of hepatocellular dysfunction, including elevated serum levels of SGOT, LDH isoenzymes 4 and 5, and occasionally, bilirubin, as well as decreased prothrombin concentration and clotting factors I, VII and X. No evidence of viral infection such as inclusions or formation of giant cells in the liver was found, despite the frequent occurrence of antecedent febrile illnesses. Possible explanations for the elevated enzyme levels in the absence of necrosis include increased cellular membrane permeability and shifts in the metabolic pathways of the hepatocytes.

0652 COMPLETE HEPATIC DEARTERIALIZATION FOR PRIMARY CARCINOMA OF THE LIVER. REPORT OF TWENTY-FOUR PATIENTS. *(E.)* Balasegaram, M. (General Hospital, Kuala Lumpur, Malaysia). *Am. J. Surg.* 124(3:340-345, 1972.

Primary liver cell carcinoma, relatively common in the Far East, is rarely seen while still resectable. Hepatic artery ligation was tried in 24 patients as an alternate palliative method. Fifteen of these patients had extensive involvement of one liver lobe, whereas in the remainder, the tumor was multiecentric. Eighteen patients had mild or advanced cirrhosis. Patients with metastases to other organs were excluded. Preoperative measures included angiography to define the vascular anatomy of the liver, and prophylactic vitamin K administration. Three patients died shortly postoperatively due to portal vein occlusion, and one due to hemorrhage. Four died of liver failure within 6 weeks after operation. Seven patients survived 4-6 months and died of tumor recurrence, and five of the remaining nine patients have survived for more than one year. Symptomatic relief was noted in patients who survived for 6 months. Thus this treatment seems of value in carefully selected cases.

0653 COPPER IN CHILDHOOD LIVER DISEASE. *(E.)* Reed, G. B.; Butt, E. M.; Landing, B. H. (Children's Hospital of Los Angeles, 4650 Sunset Blvd., Los Angeles, Calif. 90027). *Arch. Pathol.* 93:249-255, 1972.

Elevated levels of hepatic copper were sought in a survey of childhood liver diseases. Histochemical and chemical methods were used to determine the incidence. The experience gained led to several conclusions regarding the study of liver specimens. The rubeanic acid histochemical staining reaction should be used cautiously, and in conjunction with a chemical analysis for copper. The clinicopathologic analysis revealed that, besides Wilson's disease, other normal and abnormal conditions contain elevated levels of hepatic copper. Liver specimens from patients in the neonatal period, with acute or chronic bile duct obstruction, and with chronic cirrhosis had stainable and chemically elevated levels of copper. The patients with cirrhosis present difficulties when one attempts to differentiate them from patients with Wilson's disease.

0654 THE BINDING OF COPPER BY BILE AND SERUM. *(E.)* Frommer, D. (Royal Free Hosp., London, England). *Clin. Sci.* 41(6):485-493, 1971.

Dialysis against solutions of buffered sodium chloride with and without EDTA, panicillamine and sodium glycocholate was used to determine the strength of binding of ^{64}Cu to the following: (a) human albumin, serum and bile, labelled *in vitro*, from patients with and without Wilson's disease; (b) rat bile labelled *in vivo* and *in vitro*. Serum and albumin were found to bind copper comparatively weakly. Bile from all sources contains an unidentified non-diffusible fraction with a very strong binding affinity for copper. The lack of effect of a supra-micellar concentration of sodium glycocholate in the dialysis fluid on the binding of copper by bile suggests that the preservation of biliary micelles is not significant in the binding. Bile from patients with Wilson's disease binds copper as strongly as normal bile.

0655 IMMUNOPATHOLOGICAL STUDIES OF ORTHOTOPIC HUMAN LIVER ALLOGRAFTS. *(E.)* Andres, G. A.; Ansell, I. D.; Halgrimson, C. G.; Hsu, K. C.; Porter, K. A.; Starzl, T. E.; Accinni, L.; Calne, R. Y.; Herbertson, B. M.; Penn, I.; Rendall, J. M.; Williams, R. (Dept. of Pathol., State Univ. of New York, Buffalo, N. Y. 14214). *Lancet* (7745):275-280, 1972.

Light microscopy, electron microscopy, and immunofluorescence were used to study 26 specimens obtained from twenty human orthotopic liver allografts 10-968 days after transplantation. The main lesions consisted of mononuclear-cell infiltration around the portan tracts, centrilobular cholestasis, liver-cell atrophy and reticulin collapse, obliterative intimal thickening of hepatic arteries, and fibrosis. In four of the liver samples, moderate amounts of IgG and/or IgM and complement (β1C/β1A globulin or C'1q) were observed, and smaller deposits were present in another five. A further three specimens contained IgG without complement; IgA was detected in only one of the samples. The immunoglobulins were found in the walls of the portal and central veins and of the sinusoids in all thirteen positive liver samples, in the walls of branches of the hepatic artery in three, and in the cytoplasm of some of the mononuclear cells infiltrating the portal tracts in nine of the specimens. Fibrinogen was seen in eight of the samples, usually in the spaces of Disse. Accumulations of immunoglobulins and complement were less frequent in liver than in kidney and heart allografts. Cell-mediated immunity and non-immunological factors may thus be more important than humoral antibody in the failure of human liver allofrafts.

0656 THE LIVER IN RHEUMATOID ARTHRITIS. *(Ger.)* Rau, R., Kuehn, H. A. (Klin. Rheumatol, Rehabilit., Stadspital Tiemli, Zurich, Switzerland). *Schweiz. Med. Wochenschr.*, 102:635-640, 1972.

A total of 117 liver biopsies and liver function tests were performed in patients with rheumatoid arthritis. Liver biopsies were normal in 35%, while reactive hepatitis (POPPER) was seen in 43% and fatty liver in 22%. Reactive hepatitis was mild in 6%, moderate in 15% and severe in 22% of biopsies, fatty liver was mild in 11%, moderate in 7% and severe in 4% of specimens. Abnormal BSP-retention in plasma (more than 0.2 mg/100 ml, 60 min after injection of 5 mg/kg body-weight) was observed in 75% elevated alkaline phosphatase (more than 60mU/ml) in about 50%, an abnormal thymol turbidity test in 24%, and diminished prothrombin (QUICK) in 20%. Elevation of transaminases in serum and of urobilinogen in urine was, however, very rare. Elevation of bilirubin (more than 1.0 mg/100 ml) was never observed. There was a close relationship between rheumatoic arthritis activity and abnormal BSP retention, elevated alkaline phosphatase and reactive hepatitis. These findings, however, were not correlated with duration or stage of arthritis nor age of patients.

0657 SIGNIFICANCE OF ALPHA-FETOPROTEIN IN A VIRILIZING TUMOR OF THE LIVER. *(Fl.)* van Vaerenbergh, P.; Lemmens, P. (St. Lucas Kliniek, Ekeren, Belgium). *Tijdschr. Gastroenterol.* 15(3):194-204, 1972.

A case of pubertas praecox due to a gonadotrophin-producing hepatoma in a three-year-old boy is presented. Abnormal findings upon hospital admission, in addition to signs of precocious puberty, included elevated and rapidly increasing gonadoproptin production, the presence of alpha-fetoprotein in the serum, and an abnormal liver scan. At surgery, a well encapsulated, fist-sized tumor was removed. It was characterized histologically as a mixed-type malignant hepatoma. Postoperatively, the urinary gonadotropin level dropped to zero, and the alpha-fetoprotein disappeared from the serum. Despite postoperative vincristine administration, a metastasis developed in the spermatic cord 3 months after operation. Urinary gonadotropins remained negative, but alpha-fetoprotein appeared again in the serum, and metastatic processes continued. Thus alpha-fetoprotein determinations may have both diagnostic and prognostic significance.

0658 MULTINODULAR HEMANGIOMATOSIS OF THE LIVER IN INFANCY. *(E.)* McLean, R.H.; Moller, J.H.; Warwick, W.J.; Satran, L.; Lucas, R.V. (Dep. Pediat., Univ. Minnesota, Minneapolis). *Pediatrics*, 49(4):563-573, 1972.

Multinodular hemangiomatosis of the liver is an unusual cause of congestive cardiac failure in the first year of life, and is characterized pathologically by multiple hemangiomas, primarily in the liver but also in other organs. The hepatic hemangiomas act as small arteriovenous fistulae and their combined effect may result in a massive peripheral anteriovenous shunt and high output congestive cardiac failure. Patients with this condition may be recognized clinically by the classical triad of congestive cardiac failure, hepatomegaly, and cutaneous hemangiomas. All but 2 of 31 cases of multinodular hemangiomatosis of the liver reviewed had the onset of symptoms prior to 6 months of age. High output cardiac failure were severe and resulted in a 70% mortality. Hepatomegaly was massive and out of portion to the degree of cardiac failure. Therapy includes intensive treatment of congestive cardiac failure and judicious transfusion in anemic patients. Irradiation of the liver and corti-costeroids have been utilized in attempts to speed evolution of the hepatic arteriovenous fistulae. The data are not sufficient to establish the efficacy of either of these treatments.

0659 THE PERORAL AND INTRAVENOUS GALACTOSE TEST IN LIVER DISEASES. PERSONAL EXPERIENCE. *(Fr.)* De Vos, M., Demeulenaere, L. (Dep. Gastroenterol., Univ. Gand, Belgium). *Acta Gastroenterol. Belg.* 35(1-2):7-22, 1972.

0660 OPERATIONS ON THE SYMPATHETIC NERVOUS SYSTEM IN HEPATIC, BILARY AND PANCREATIC DISEASES. *(Fr.)* Arianoff, A. A., van Reefinghen, P.; Vielle, C.; Gose, C. (Clin. St. Elisabeth, Brusseles, Belgium). *Acta Gastroenterol. Belg.* 35(1-2):35-55, 1972.

0661 IDOPATHIC ACUTE FATTY LIVER OF PREGNANCY DEATH FORM EXTRAHEPATIC MANIFESTATIONS. *(E.)* Hatfield, A. K., Stein, J. H.; Greenberger, N. J.; Abernathy, R. W.; Ferris T. F. (Ohio State Univ. Coll. Med., Columbus). *Am. J. Dig. Dis.* 17(2):167-178, 1972.

0662 SERUM ALPHA$_1$-FETOGLOBULIN IN A PATIENT WITH HEPATIC METASTASES FROM BRONCHOGENIC CARCINOMA. *(E.)* Corlin, R. F.; Tompkins, R. K. (UCLA Cent. Health Sci., Los Angeles, Calif.). *Am. J. Dig. Dis.* 17(6):553-555, 1972.

0663 GLUCOSE INTOLERANCE IN WILSON'S DISEASE. NORMALIZATION AFTER TREATMENT WITH PENICILLAMINE. *(E.)* Johansen, K.; Gregersen, G. (Kommunehosp., Aarhus, Denmark). *Arch. Intern. Med.* 129(4):587-590, 1972.

0664 AETIOLOGY OF LIVER CANCER. *(E.)* Anonymous. *Br. Med. J.* (5795):261-262, 1972.

0665 IMMUNOGLOBULIN LEVELS IN NEWBORN INFANTS WITH HEPATOSPLENOMEGALY. *(E.)* Tan, K. L.; Chan, Y. C. (Fac. Med., Univ. Singapore). *Br. Med. J.* (5795):269-270, 1972.

0666 HEPATIC TUMOURS IN CHILDHOOD. *(E.)* Anonymous. *Br. Med. J.* (5797):394-394, 1972.

0667 THE ASTROCYTE IN LIVER DISEASE. *(E.)* Solitare, G. B. (Yale Univ. Sch. Med., New Haven, Conn.). *Lancet* (7745):319-320, 1972.

0668 HEPATITIS-ASSOCIATED ANTIGEN IN HEPATOMA IN SOUTH VIETNAM. *(E.)* Welsh, J. D.; Brown, J. D.; Arnold, K.; Chandler, A. M.; Mau, H. M.; Thuc, T. K. (Univ. Oklahoma Health Sci. Cent., Okla. City). *Lancet* (7750):592, 1972.

0669 ULTRASTRUCTURAL CHANGES OF HEPATOCYTES IN HYPERLIPOPROTEINAEMIA. *(E.)* Kovacs, K.; Lee, R.; Little, J. A. (St. Michael's Hosp., Univ. Toronto, Ontario, Canada). *Lancet* (7753):752-753, 1972.

0670 SYNTHESIS OF AN ABNORMAL PROTHROMBIN IN MALNUTRITION AND BILIARY OBSTRUCTION AND DURING DICUMAROL TREATMENT. *(E.)* Ganrot, P. O.; Nilehn, J.-E. (Dep. Clin. Chem., Allmaenna Sjukhuset, Malmoe, Sweden). *Scand. J. Clin. Lab. Invest.* 28(3):245-249, 1971.

0671 *p*-HYDROXYPHENYLPYRUVATE HYDROXYLASE ACTIVITY IN FINE-NEEDLE ASPIRATION LIVER BIOPSIES IN HEREDITARY TYROSINEMIA. *(E.)* Gentz, J.; Lindblad, B. (St. Goeran's Hosp., Karolinska Inst., Stockholm, Sweden). *Scand. J. Clin. Lab. Invest.* 29(1):115-126, 1972.

0672 OBSERVER ERROR AND SAMPLING VARIABILITY TESTED IN EVALUATION OF HEPATITIS AND CIRRHOSIS BY LIVER BIOPSY. *(E.)* Soloway, R. D.; Baggenstoss, A. H.; Schoenfield, L. J.; Summerskill, W. H. J. (Mayo Clin. Mayo Found., Rochester, Minn.). *Am. J. Dig. Dis.* 16(12):1082-1086, 1971.

0673 INDOCYANINE-GREEN TEST IN CHRONIC HEPATITIS. *(Pol.)* Tkaczewski, W.; Karasek, E.; Matuszak, J.; Niedzlelska, H.; Skarbek-Galamon, C. (Clin. Inf. Dis., Warsaw Acad. Med., Warsaw, Poland). *Pol. Tyg. Lek.* 26(47):1807-1810, 1971.

0674 TRAUMATIC LESIONS OF THE LIVER. *(Fr.)* Griffe, J.; Rouiller, R.; Doumbe, E.; Crespy, G. (Clin. Chir. A., Nantes, France). *Ouest Med.* 25(15):1471-1475, 1972.

0675 URINARY COPROPORPHYRIN AS AN INDEX OF LIVER FUNCTION IN WOMEN ON ORAL CONTRACEPTIVES. *(Th.)* Titthasiri, N. (Dep. Biochem., Siriraj Hosp., Thailand). *Siriraj Hosp. Gaz.* 24(2):192-204, 1972.

0676 HISTOPATHOLOGY OF THE LIVER IN ERYTHROPOIETIC PROTOPORPHYRIA. *(Sp.)* Mascaro, J. M.; Aguade, J. P.; Bruguera, M.; Galy-Mascaro, C. (Fac. Med. Barcelona, Barcelona, Spain). *Med. Cutanea* 5(6):441-448, 1971.

0677 STUDIES ON IRON AND HEPATIC FUNCTION IN SIDEROPHILIC DISEASE (HEMOCHROMATOSIS). *(Sp.)* Selles, F. P. (Stoffwechselklin., Bad Mergentheim, Germany). *Rev. Clin. Esp.* 124(3):239-248, 1972.

0678 PROTEIN-DEGRADING LYSOSOMAL ENZYME ACTIVITIES OF HUMAN LIVER TISSUE IN DIFFERENT LIVER DISEASES. *(Ger.)* Stein, U. Heissmeyer, H.; Zimmerman, W.; Lesch, R. (Med. Univ. Klin., Univ. Frieburg, Freiburg, Germany). *Klin. Wochenschr.* 19(23):1271-1274, 1971.

0679 PRIMARY CARCINOMA OF THE LIVER IN ADULTS. SURGICAL TREATMENT BY PARTIAL HEPATOMY. *(Fr.)* Moreaux, J.; Veyrieres, M.; Hepp, J.; (Hop.

Bichat, Paris, France). *Nouv. Presse Med.* 1(17):1139-1142, 1972.

0680 ENZYME RESPONSE TO THYROTOXICOSIS AND HYPOTHYROIDISM IN HUMAN LIVER AND MUSCLE: COMPARATIVE ASPECTS. *(Ger.)* Nolte, J.; Pette, D.; Bachmaier, B.; Kiefhaber, P.; Schneider, H.; Scriba, P. C. (Fachbereich Biol. Univ. Konstanz, Konstanz, Germany). *Eur. J. Clin. Invest.* 2:141-149, 1972.

0681 HEPATIC ARTERY LIGATION AND ARTERIAL DEPRIVATION OF THE LIVER. *(Fr.)* Couinaud, C. (Hop. Saint-Louis, Paris, France). *J. Chir. (Paris)* 104(1-2):7-22, 1972.

0682 PRESERVING AN ERROR IN METABOLISM (NIEMANN-PICK'S DISEASE) IN A LONG-TERM TISSUE CULTURE OF LIVER PARENCHYMAL CELLS. *(Fr.)* Gautier, M.; Rachman, F.; Carreau, J.-P.; Garcon, E.; Raulin, J. (Hop. Parrot, Bicetre, France). *Arch. Fr. Pediatr.* 29(6):635-639, 1972.

0683 TREATMENT OF HEPATOCELLULAR FAILURE WITH ORNITHINE CARBAMYL TRANSFERASE. *(Fr.)* Heully, F.; Gaucher, P.; Jenpierre, R. (Hop. Saint-Julien, Nancy, France). *Therapeutique* 48(5-6):381-384, 1972.

0684 ACETOIN BLOOD LEVEL CHANGES OCCURRING IN PATIENTS WITH LIVER DISEASE. II. VARIATIONS IN BLOOD ACETOIN AFTER INTRAVENOUS ADMINISTRATION OF GLUCOSE. *(Cz.)* Houbal, V.; Horecka, J.; Parak, S. (Fac. Med. Brno, Czechoslovakia). *Cas. Lek. Cesk.* 111(27):617-620, 1972.

0685 SOME EFFECTS OF S-ADENOSYLMETHIONINE-DEPENDENT TRANSMETHYLATIONS IN HEPATOLOGY. *(It.)* Labo, G.; Gasbarrini, G.; Miglio, F. (U. Bologna, Italy). *Minerva Med.* 63(35):2007-2017, 1972.

0686 JAUNDICE AS A COMPLICATION OF LEUKEMIA. *(Pol.)* Moszczynski, P.; Lisiewica, J.; Hofman, K. (Inst. Int. Med., Krakow, Poland). *Wiad. Lek.* 25(15):1337-1341, 1972.

0687 VITAMIN B12 IN NORMAL HUMAN LIVER TISSUE. *(Ger.)* Kautzsch, E. (Med. Abt. Staedtischen Krankenhauses Muenchen-Oberfoehring, Germany). *Klin. Wochenschr.* 50(8):445-447, 1972.

See also 0096, 0149, 0210, 0213, 0217, 0219, 0224, 0226, 0233, 0693, 0750, 0792, 0796, 0811, 0816, 0898, 0907, 0908

LIVER AND BILIARY TRACT

Hyperbilirubinemic States

0688 INFLUENCE OF BILIRUBIN ON HUMAN PLATELETS. *(E.)* Maurer, H. M., Caul, J. (Med. Coll. of Virginia, Virginia Comm. Univ., Richmond). *Pediatr. Res.* 6(2):136-144, 1972.

Unbound unconjugated bilirubin at low concentration (0.5 mg/100 ml) caused yellow staining and aggregation of washed human platelets, whereas bilirubin bound to albumin and bilirubin altered by exposure to light had little, if any, of these effects on platelets. Less intense aggregation occurred in some but not all samples of platelet-rich plasma incubated with bilirubin and only at bilirubin levels of 10 mg/100 ml or higher. Aggregation of platelets by bilirubin showed an absolute requirement for calcium ions and this response was enhanced by potassium ions. Adenosine diphosphate and adenosine triphosphate were released from platelets with bilirubin. The data presented suggest that the effect of bilirubin on platelets could play a role in producing intravascular thrombosis or hemorrhage, or both, in severe hyperbilirubinemia.

0689 PLACENTAL TRANSFUSION AND HYPERBILIRUBINEMIA IN THE PREMATURE. *(E.)* Saigal, S.; O'Neill, A.; Suraindar, Y.; Chua, L.-B.; Usher, R. (Royal Victoria Hospital, Montreal, Que., Canada). *Pediatrics* 49(3):406-419, 1972.

By means of immediate or delayed clamping of the umbilical cord, placental transfusion has been compared in premature and full-term infants. According to blood volume measurements, the 5-minute transfusion was similar to full-term and premature infants (47% and 50% increase in blood volume from birth). A larger proportion of the 5-minute transfusion had occurred by 1 minute in full-term (76%) than in premature infants (56%). By increasing red cell volume placental transfusion, greatly enhanced the severity of neonatal hyperbilirubinemia. Bilirubin concentrations of 15 mg/100 ml developed in only 6% of premature infants when cord clamping was immediate, in 14% when cord clamping was delayed 1 minute, and in 38% after a 5-minute delay in cord clamping.

0690 BILIRUBIN PRODUCTION AS A MEASURE OF RED CELL LIFE SPAN. *(E.)* Berk, P. D.; Bloomer, J. R.; Howe, R. B.; Blaschke, T. F.; Berlin, N. I. (Nat. Inst. of Health, Bethesda, Md.). *J. Lab. Clin. Med.* 79(3):364-378, 1972.

Simultaneous determinations of bilirubin production rate and total red cell volume were performed on 70 occasions in 56 individuals. The population studied included 16 normal volunteers and 40 patients with a spectrum of disease states. Mean red cell life span was calculated from bilirubin production rate and red cell volume. In these calculations, it was assumed that 85 per cent of the bilirubin production resulted from catabolism of the hemoglobin of circulating red blood cells. The validity of this assumption in most disease states was indicated by the high degree of correlation between red cell life span and independent measurements of red cell survival using ^{3}H-diisopropylfluorophosphate ($r = 0.98$), ^{59}Fe ferrokinetics ($r = 0.85$), and ^{51}Cr red cell halflife ($r = 0.85$). The hypothesis was also confirmed by the results of 9 studies in which the peak protoporphyrin/urobilin specific activity ratio and/or the early labeled peak were determined directly following the administration of glycine 2-^{14}C. The assumption is not valid in the few conditions characterized by increased ineffective erythropoiesis. In normal adult volunteers, red cell life span averaged 104 ± 15 days, and was shorter in women than in women than men.

0691 METABOLISM OF THE BROMSULPHALEIN IN DUBIN-JOHNSON SYNDROME. DIAGNOSTIC VALUE OF THE PARADOXICAL INCREASE IN PLASMA LEVELS AT BSP. *(E.)* Rodes, J., Zubizarreta, A.; Bruguera, M. (Hosp. Clin. Provincial, Univ. Barcelona, Spain). *Am. J. Dig. Dis.* 17(6):545-552, 1972.

0692 POSSIBLE INTERACTION OF ETHANOL WITH UNCONJUGATED BILIRUBIN IN JAUNDICED SUBJECTS. *(E.)* Garbagnati, E., Manitto, P. (Clin. Pediat., Univ. Milano, Italy). *Lancet* (7752):693, 1972.

0693 CONGENITAL AND FAMILIAL DEFECTS OF BILIRUBIN METABOLISM. *(Sp.)* Rodriguez Cuartero, A. (Univ. Granada, Spain). *Rev. Esp. Enferm. Apar. Dig.* 37(3):385-396, 1972.

0694 BILIRUBIN BINDING BY HUMAN ERYTHROCYTES. *(E.)* Bratlid, D. (Univ. Hosp., Oslo, Norway). *Scand. J. Clin. Lab. Invest.* 29(1):91-97, 1972.

0695 THE QUESTION OF DIARRHEA AND PHOTOTHERAPY. *(E.)* Washington, J. L.; Brown, A. W.; Starrett, A. L. (Charity Hosp., New Orleans, La.). *Pediatrics* 49(2):279-280, 1972.

0696 HEPATIC UPTAKE AND CONJUGATION OF ^{14}C-BILIRUBIN DURING HIGH-DOSAGE FOUR-HOUR INTRAVENOUS LOADING WITH BILIRUBIN IN HEALTHY ADULTS. *(Ger.)* Schmidt, M.; Stich, W. (Univ. und Inst. fuer Haematol. der GSF, Munich, Germany). *Klin. Wochenschr.* 49(21):1183-1184, 1971.

0697 ELECTRON MICROSCOPIC FINDINGS IN THE LIVER OF A CHILD WITH GILBERT'S SYNDROME. *(Pol.)* Hager-Malecka, B.; Romanska, K.; Rusiecka, A.; Grzlywna, W.; Grzybek, H. (Dept. Pediat., Zabrze Acad. Med., Zabrze, Poland). *Pol. Tyg. Lek.* 26(52):2026-2027, 1971.

0698 HEPATOLOGY IN INFANTS: BILIRUBIN METABOLISM; PHYSIOLOGICAL ICTERUS; KERNICTERUS. *(Fr.)* Dommergues, J.-P. (no affil.). *Nouv. Presse Med.* 1(17):1151-1153, 1972.

0699 FECAL EXCRETION OF ROSE BENGAL I^{131} IN THE DIAGNOSIS OF OBSTRUCTIVE JAUNDICE IN INFANCY WITH SPECIAL REFERENCE TO BILIARY ATRESIA. *(E.)* Maksoud, J. G.; Thom, A. F.; Kieffer, J.; Pinto, V. A. C. (Exp. Pediat. Surg. Div., Sao Paulo Univ., Sao Paulo, Brazil). *Pediatrics* 48(6):966-969, 1971.

0700 FACTORS INFLUENCING THE ACCUMULATION OF BILIRUBIN IN AMNIOTIC FLUID IN Rh HEMOLYTIC DISEASE. *(E.)* Polacek, K.; Zwinger, A. (Inst. Care Mother Child, Prague-Podolf, Czechoslovakia). *Biol. Neonate* 19(4-6):253-257, 1971.

0701 COMPARATIVE ANALYSIS BETWEEN THE RESERVE ALBUMIN-BINDING CAPACITY (HBABA METHOD) AND THE SATURATION INDEX OF HYPERBILIRUBINEMIC SERA. *(E.)* Priolisi, A.; Ziino, L. (Ist. Clin. Pediat. Univ. Palermo, Palermo, Italy). *Biol. Neonate* 19(4-6):258-271, 1971.

0702 INTEREST AND LIMITATIONS OF TREATMENT WITH POLYVINYLPYRROLIDONE (AN INTESTINAL BINDER OF UNCONJUGATED BILIRUBIN) IN NEONATAL JAUNDICE. *(Fr.)* Ploussard, J.-P.; Foliot, A.; Christoforov, B.; Petite, J.-P.; Alison, F.; Etienne, J.-P.; Housset, E. (Hop. Bretonneau, Paris, France). *Arch. Fr. Pediatr.* 29(4):373-390, 1972.

0703 PHOTOTHERAPY: BILIRUBIN PRODUCTS RESULTING UPON ITS PHOTO-EXPOSURE *IN VITRO* AND SPECULATIONS ON THE MECHANISM OF ACTION OF LIGHT *IN VIVO*. *(It.)* Garbagnati, E. (II. Clin. Ped. U. Milano, Milan, Italy). *Minerva Pediatr.* 24(19):809-816, 1972.

See also 0676, 0807

Acute Nonviral Hepatitis and Hepatic Injury

0704 HEPATIC INJURY ASSOCIATED WITH THE PHENOTHIAZINES. *(E.)* Ishak, K. G.; Irey, N. S. (Armed Forces Inst. of Pathol., Washington, D.C.). *Arch. Pathol.* 93(4):283-304, 1972.

A relationship between phenothiazine and hepatic changes was validated in 36 and 94 patients with phenothiazine-implicated drug reactions. Clinical, laboratory, and pathological findings on the 36 cases are presented along with follow-up data. Thirty-three of the 36 patients had received chloropromazine prior to onset of jaundice; the remaining three patients were taking prochloroperazine. The major physical finding in the group was icterus of the sclerae or skin, or both. Significant abnormalities revealed by laboratory tests were peripheral eosinophilia, hyperbilirubinemia, hyperphosphatasemia, hypercholesterolemia, and hypertransaminasemia. The major morphological change in the series was cholestastis, the appearance and distribution of which did not differ from that in extrahepatic biliary obstruction at the microscopic level. Methods of distinguishing phenothiazine injury from extrahepatic biliary lesions are discussed. Six patients had a chronic course lasting from several months to over three yrs. Twenty-nine patients were fully recovered within 12 wk after discontinuance of phenothiazine therapy.

0705 EFFECT OF RIFAMPICIN AND ISONIAZID ON LIVER FUNCTION. *(E.)* Satinder, L.; S. N. Singhal; Burley, D. M.; Crossley, G. (General Hospital, Bury, Lancashire, England). *Br. Med. J.* (5593):148-150, 1972.

The effects of rifampicin and isoniazid on liver function were studied in 63 patients with pulmonary tuberculosis; 29% showed abnormalities of serum aspartate aminotransferase (SGOT), i.e., more than 60 units/ml, and a similar percentage showed abnormalities of serum bilirubin, i.e., 1.5-4.2 mg/100 ml. The abnormalities occurred in the first 12 wk of therapy and persisted for approximately 14 days, regardless of whether therapy was interrupted or continued. Eight of nine raised SGOT patients assessed for the relationship between SGOT and acetylator pehnotype were slow acetylators. These results indicate that hepatic reactions in patients with previous normal liver function are mild and nonspecific. However, patients who continue with rifampicin should be kept under close biochemical observation.

0706 METHOTREXATE HEPATOTOXICITY IN PSORIASIS -- COMPARISON OF DIFFERENT DOSE REGIMENS. *(E.)* Dahl, M. G. C.; Gregory, M. M.; Scheuer, P. J. (Royal Victoria Infirmary, Newcastle upon Tyne NE1 4 LP, England). *Br. Med. J.* (5801):654-656, 1972.

Liver histological appearance was investigated in 44 patients treated for psoriasis with methotrexate. Cirrhosis was found in six patients and hepatic fibrosis in 11. Of these 17 patients, 12 had received frequent small doses of methotrexate (2.5 mg/day, 2-5 days/wk), two had received intermittent large doses (5-45 mg administered orally or i.m. at 1-4 wk intervals), and three had been treated by both methods. The prevalence of cirrhosis and fibrosis was significantly greater in patients treated by frequent small doses than in those treated by intermittent large doses even though monthly dose levels were similar for both groups. In patients receiving frequent small doses, severity of liver damage was related to duration of treatment. These results demonstrate that intermittent large dosage is the preferred treatment regimen in the few circumstances when methotrexate is indicated. Hepatic fibrosis, sometimes preceding cirrhosis, appears to be an inevitable consequence of prolonged treatment with small frequent doses.

0707 PHENOBARBITAL-INDUCED CHANGES IN NADPH-CYTOCHROME C REDUCTASE AND SMOOTH ENDOPLASMIC RETICULUM IN HUMAN LIVER. *(E.)* Thaler, M.M.; Dallman, P.R.; Goodman, J. (Dep. Pediat., Univ. California, San Francisco). *J. Pediatr.* 80(2):302-310, 1972.

NADPH-cytochrome c reductase, one of the enzyme components of the hepatic microsomal electron transport system which is responsible for drug metabolism, was determined in the livers of 14 children. The children were between 7 days and 5 years of age; 6 were normal and 8 had cholestasis. Eight patients were studied before and during phenobarbital administration. Basal reductase activity in normal and jaundiced children was 10.8-54.4η moles of cytochrome c reduced/min/g liver protein. Administration of phenobarbital to 8 subjects at 10 mg/kg/day for 5 days increased reductase activity 30 to 150% in five of the patients with liver disease. In cases where enzyme activity was enhanced, electron microscopy of liver tissue before and during phenobarbital revealed proliferated endoplasmic reticulum. Children with increased NADPH-cytochrome c reductase activity had lower serum phenobarbital concentrations and milder sedative responses than children in whom the enzyme was not stimulated. Chronic liver disease may thus depress or eliminate phenobarbital-induced stimulation of microsomal processes in man.

0708 EXPERIMENTAL BASES FOR THE DIFFERENT HEPATOTOXICITY OF ERYTHROMYCIN PREPARATIONS IN MAN. *(E.)* Dujovne, C. A.; Shoeman, D.; Bianchine, J.; Lasagna, L. (Univ. Kansas Med. Cent. Kansas City). *J. Lab. Clin. Med.* 79(5):832-844, 1972.

0709 HEPATIC TOLERANCE OF THE RIFAMPICINE-ISONIAZID COMBINATION. *(Fr.)* Toulet, J.; Plomteux, G.; Viteau, J. M.; Abiven, M.; Bonfante, N. (Hop. Int. Univ. Paris, Paris, France). *J. Med. Liban.* 24(6):651-658, 1971.

0710 HALOTHANE HEPATITIS - TRUE OR FALSE? *(E.)* Triger, D. R.; Millward-Sadler, G. H. (Dep. Med. Pathol., Radcliffe Infirmary, Oxford, England). *Oxford Med. Sch. Gaz.* 24(2):30-32, 1972.

0711 MASSIVE HEPATIC NECROSIS AFTER FLUROXENE ANESTHESIA - A CASE OF DRUG INTERACTION? *(E.)* Reynolds, E. S.; Brown, B. R.; Vandam, L. D. (Dep. Pathol. Anaesth. Peter Bent Brigham Hosp., Harvard Med. Sch., Boston, Mass.). *N. Engl. J. Med.* 286(10):230-231, 1972.

0712 FEBRILE TOXIC HEPATITIS WITH EOSINOPHILIA, LYMPHADENOPATHY, AND EXANTHEMA DURING PHENYTOIN THERAPY. *(Dan.)* From, E.; Simonsen, E. F. (Odense Sygehus, Denmark). *Ugeskr. Laeger* 133(48): 2376-2377, 1971.

0713 STUDIES ON THE LIVER TOLERANCE TO HALOGENATED ANESTHETICS. *(Fr.)* Wilbert, L. (Inst. Anesthesiol. U. Goettingen, Germany). *Cah. Anesthesiol.* 20(3):263-270, 1972.

0714 BRUCELLOSIS AND LEPTOSPIROSIS: HISTOLOGICAL BIOPSY FINDINGS IN THE LIVER. *(Ger.)* Herms, G. (Bezirkskrankenhaus Altstadt Magdeburg, Germany). *Z. Ges. Inn. Med.* 27(11):474-477, 1972.

See also 0146, 0223, 0748, 0773

LIVER AND BILIARY TRACT

Acute Viral Hepatitis

0715 LIVER BIOPSIES IN PATIENTS WITH AND WITHOUT AUSTRALIA ANTIGEN. *(E.)* Gerstley, B.J.S.; Custer, R.P.; Blumberg, B.S.; London, W.T.; Sutnick, A.I.; Coyne, V.Z. (Inst. for Cancer Res., Fox Chase, Philadelphia, Pa.). *Arch. Pathol.* 93(4): 366-371, 1972.

Liver biopsy specimens were obtained from 63 patients, including 23 with Down's syndrome Au(1), 20 with Down's syndrome Au(0), 16 mentally retarded patients without Down's syndrome, 15 of whom were Au(0) and one, Au(1). The specimens were subjected to a "blind" microscopic study to determine if the presence of Au(1) in serum is invariably associated with liver disease and if liver biopsy tissue from Down's syndrom patients with Au(1) can be distinguished from that in which the antigen has not been demonstrated. Abnormalities consistent with a diagnosis of hepatitis, present or past, were found in 22 cases; of these 17 occurred among the Down's Au(1) group. Persistent Au(1) is thus associated in a highly significant manner with hepatocellular damage.

0716 ACUTE HEPATIC COMA SUCCESSFULLY TREATED BY EXTRACORPOREAL BABOON LIVER PERFUSIONS. *(E.)* Abouna, G. M.; Fisher, L. McA.; Still, W. J.; Hume, D. M. (Med. Coll. of Georgia, Augusta). *Br. Med. J.* (5791):23-25, 1972.

Two patients in deep hepatic coma as a result of fulminant viral hepatitis were successfully treated by extracorporeal baboon liver perfusion following failure to respond to medical treatment and three consecutive exchange transfusions. Both patients recovered full consciousness after a 13- and 16-hour perfusion, respectively, made a complete recovery, and were leading normal lives seven and eight months after treatment. In addition ot producing clinical recovery, the liver perfusions were followed by pronounced clearing of bilirubin and a pronounced rise in the level of blood clotting factors. The prolonged perfusions were free of immunological and other complications, and the patients did not develop antibaboon serum antibodies. While the blood exchange transfusions were effective in clearing bilirubin, they produced no demonstrable clinical improvement.

0717 HEPATITIS-ASSOCIATED ANTIGEN AND ANTIBODY IN UGANDA: CORRELATION OF SEROLOGICAL TESTING WITH HISTOPATHOLOGY. *(E.)* Anthony, P. P.; Vogel, C. L.; Sadikall, F.; Barker, L. F.; Peterson, M. R. (Middlesex Hospital Medical School, London, England). *Br. Med. J.* (5797):403-406, 1972.

Ninety-one Ugandans with cirrhosis were studied for the relationship between histopathological features and the presence of hepatitis-associated antigen (H.A.A.) and antibody (anti-H.A.A.). H.A.A. was present in 30 (32.9%) of the 91 patients as compared with only seven of 224 controls drawn from the same population. Younger subjects and males were more frequently positive. There was no difference in the presence of anti-H.A.A. antibody between patients (30.7%) and controls (30.8%). Macronodular (posthepatatic, postnecrotic) types of cirrhosis, which predominate in Uganda, were associated with the presence of H.A.A.; the much less common micronodular (nutritional) type was not. However, alcoholism appeared to have a significant role in nutritional cirrhosis. Detailed histological analysis also showed that the presence of H.A.A. was associated with two types of cellular damage: liver cell swelling and liver cell dysplasia. The data suggest an etiological role for H.A.A. in most cases of cirrhosis in Uganda.

0718 FOUR CASES OF PERIARTERITIS NODOSA ASSOCIATED WITH PERSISTENT AUSTRALIA ANTIGEN.

(E.) Trepo, C., Thivolet, J.; Lambert, R. (Fac. of Med., Lyon, France). *Digestion* 5:100-107, 1972.

Australia antigen was detected in the blood serum of 7 out of 16 tested patients with periarteritis nodosa. Case histories are presented for 4 of these patients with clinically typical and histologically proved periarteritis nodosa. Australia antigenemia can appear early in the disease and seems to persist at a high constant level in all cases. Initial exposure to hepatitis virus was considered probable in 3 cases. Clinical hepatic manifestations signaled the disease onset in two cases and were absent in one. These findings confirm previous reports of an association between Australia antigen and periarteritis nodosa. Affiliation between hepatitis and polyarteritis induced by the same virus is suggested.

0719 HEPATITIS AND HEPATITIS-ASSOCIATED ANTIGEN IN 56 MOTHER-INFANT PAIRS.

(E.) Schweitzer, I.L.; Wing, A.; McPeak, C.; Spears, R.L. (John Wesley Co. Hosp., Los Angeles, Calif.). *JAMA* 220(8):1092-1095, 1972.

Hepatitis and the hepatitis associated antigen were studied in 56 mothers who had acute viral hepatitis during pregnancy or within six months of delivery and their infants who were tested for hepatitis-associated antigen at least once. Twenty-six mothers were antigen positive during the acute illness, and hepatitis-associated antigen was found in the infants of ten. In 17 of these women antigen-positive hepatitis occurred within two months of delivery, and eight of their babies were found to be antigen-positive. Hepatitis-associated antigen was found in two of 19 cord bloods tested. The antigen appeared to cross the placental barrier in three cases, and neonatal contamination at birth seemed to occur in one. Persistent antigenemia and protracted subclinical hepatitis were found in all hepatitis-associated antigen-positive babies.

0720 THE OCCURRENCE OF EPIDEMIC INFECTIOUS HEPATITIS IN CHRONIC CARRIERS OF AUSTRALIA ANTIGEN.

(E.) Dietzman, D. E.; Matthew, E. B.; Madden, D. L.; Sever, J. L.; Rostafinski, M.; Bouton, S. M.; Nagler, B. (Nat. Inst. of Neurol. Dis. and Stroke, Bethesda, Md.). *J. Pediatr.* 80(4)part 1:577-582, 1972.

In a major epidemic of infectious hepatitis at an institution for the mentally retarded, patients with chronic Australia antigenemia were found to be quite susceptible to infectious hepatitis. This observation provides additional evidence that serum hepatitis and infectious hepatitis are immunologically unrelated and caused by different etiologic agents. Frequency of Australia antigenemia at the institution was somewhat lower than reported for comparable institutions. The antigen was present in 23% of patients with Down's syndrome and in 6% of other mentally retarded patients. The antigen was more prevalent in younger than in older patients and twice as prevalent in males as in females.

0721 VISUALIZATION OF VIRUS-LIKE PARTICLES IN ENDOPLASMIC RETICULUM OF HEPATOCYTES OF AUSTRALIA ANTIGEN CARRIERS.

(E.) Stein, O.; Fainaru, M.; Stein, Y. (Hebrew Univ.-Hadassah Med. Sch., Jerusalem, Israel). *Lab. Invest.* 26(3):262-269, 1972.

Five of 1600 normal blood donors tested for the presence of Australia antigen in their serum were consistently antigen-positive. Percutaneous liver biopsies from the five volunteers were examined by electron microscopy and in two cases hepatocytes with distorted endoplasmic reticulum elements were noted. The cisternae were filled with filamentous or tubular material in the vicinity of which round or ellipsoid particles were seen. The particles were about 35 nm, showed a membrane-like envelope, and contained a small electron-opaque core that was often eccentric. As similar particles were present in sections of pellets obtained from sera of Australia antigen carriers, the observed liver particles appear to represent the intrahepatic form of the virus.

0722 IMMUNOLOGICAL STUDIES IN AN EPIDEMIC OF INFECTIVE, SHORT-INCUBATION HEPATITIS.

(E.) Ajdukiewicz, A. B.; Fox, R. A.; Dudley, F. J.; Doniach, D.; Sherlock, S. (Royal Free Hospital, London, England). *Lancet* (7755):803-805, 1972.

Seventy-five patients with short-incubation infective hepatitis were examined for hepatitis-associated antigen (HAA), epidemic hepatitis-associated antigen (EHHA), autoantibodies, and serum-immunoglobulins. Sera from all patients were consistently negative for HAA. Epidemic hepatitis-associated antigen was detected in more than 90% of the patients in the first two weeks of illness but was not detected in convalescents. Smooth-muscle antibody was found in 74% of the patients, the frequency of this antibody being highest in the first week. Titers reached a maximum of 1/80 in the acute phase and all became negative after 14 wk. Serum-immunoglobulin levels were high in the first week and significantly lower during convalescence. No significant differences were seen between acute and convalescent serum-immunoglobulin A or G levels.

0723 CYTOPLASMIC LOCALISATION OF AUSTRALIA ANTIGEN IN THE LIVER.

(E.) Hadziyannis, S., Moussouros, A.; Vissoulis, C.; Afroudakis, A. (Hippokraton General Hospital, Athens 610, Greece). *Lancet* (7758):976-979, 1972.

Immunofluorescence was used to detect Australia antigen in liver specimens from 9 patients with chronic liver disease and circulating Australia antigen, and from 22 Australia antigen carriers with histologically normal livers. The antigen was not found in the livers of 23 seronegative patients. Australia antigen was localized in the cytoplasm of hepatocytes; no nuclear fluorescence specific for Australia antigen was detected. The number of fluorescent liver cells and the intensity of fluorescence were much greater in

Australia antigen carriers than in patients with liver disease. No γ-globulin or β-1C was found in any of the liver specimens. Thus Australia antigen may apparently be a virus-coat material produced in excess in the cytoplasm of liver cells, and its presence in the liver unrelated to the cytopathic effects of hepatitis virus B. A balanced intracellular infection in apparently healthy Australia antigen carriers may produce large amounts of Australia antigen in the cytoplasm of the hepatocytes but few or no infectious viruses.

0724 PREVENTION OF ENDEMIC HAA-POSITIVE HEPATITIS WITH GAMMA GLOBULIN. *(E.)* Ginsberg, A. L., Conrad, M. E.; Bancroft, W. H.; Ling, C. M.; Overby, L. R. (Walter Reed Army Inst. of Res., Washington, DC). *N. Engl. J. Med.* 286(11):562-566, 1972.

A simple radioimmune assay method was used to detect Australia antigen in serum specimens from normal military blood donors and soldiers with endemic icteric hepatitis. This method detected more than twice the number of Australia antigen-positive specimens among both groups of subjects than other available methods, including the agar-gel diffusion, immunoelectro-osmophoresis, complement-fixation and passive hemagglutination-inhibition methods. About 1 per cent of screened military blood donors and 25 per cent of soldiers with icteric endemic hepatitis had the antigen in their serum. Previous studies showed that the prophylactic administration of human serum gamma globulin decreased the incidence of both Australia antigen-positive and Australia antigen-negative endemic icteric hepatitis. The availability of a new and more sensitive assay for Australia antigen provided more convincing evidence that injection of gamma globulin with a high anti-Australia antigen titer protects against Australia antigen-positive icteric endemic hepatitis for about six months.

0725 SEARCH FOR FERRIS'S FECAL ANTIGEN AND AUSTRALIA ANTIGEN IN STOOL SAMPLES OBTAINED DURING A LARGE OUTBREAK OF INFECTIOUS HEPATITIS. *(E.)* Madden, D.L.; Matthew, E.B.; Dietzman, D.E.; Sever, J.L.; Nagler, B. (Nat. Inst. of Neurological Dis. and Stroke Nat. Inst. Health., Bethesda, Md., and Lynchburg Training Sch. and Hosp., Lynchburg, Va.). *Proc. Soc. Exp. Biol. Med.* 139(3):1028-1031, 1972.

The present study was undertaken to identify fecal antigens or antibodies in 22 patients with infectious hepatitis and 8 subjects without hepatitis from a large epidemic of infectious hepatitis. A "fecal antigen" was recently found in approximately 40% of stool extracts obtained from patients with infectious hepatitis and approximately 3% of non-hepatitis patients. Antigens was detected in only 6% of stool samples from infected patients and in no samples from uninfected patients. Neither Australia antigen nor Australia antibody was detected in stool samples from serum Australia antigen carriers. This indicates that the recently described "fecal antigen" was probably not associated with this epidemic.

0726 HEPATITIS AFTER KONYNE ADMINISTRATION. *(E.)* Oken, M. M., Hootkin, L.; DeJager, R. L. (William Beaumont Gen. Hosp., El Paso, Tex.). *Am. J. Dig. Dis.* 17(3):271-274, 1972.

0727 TOTAL SCREENING OF BLOOD DONATIONS FOR AUSTRALIA (HEPATITIS ASSOCIATED) ANTIGEN AND ITS ANTIBODY. *(E.)* Wallace, J., Milne, G. R.; Barr, A. (Law Hosp., Carluke, Lanarkshire, Scotland). *Br. Med. J.* (5801):663-664, 1972.

0728 HEPATITIS-ASSOCIATED ANTIGEN IN SELECTED MOTHERS AND NEWBORN INFANTS. *(E.)* Keys, T. F., Sever, J. L.; Hewitt, W. L.; Gitnick, G. L. (Sepulveda VA Hosp., Calif.). *J. Pediatr.* 80(4):650-654, 1972.

0729 ON THE QUANTITATIVE ASSESSMENT OF AUSTRALIA-(Au/SH)-ANTIGEN AND THE CLINICAL COURSE OF SERUM HEPATITIS. *(Ger.)* Kapp, J.-F., Kuwert, E. (Klin. Essen Ruhr-Univ., Essen, Germany). *Klin. Wochenschr.* 50(5):266-268, 1972.

0730 CELLULAR IMMUNITY AND HEPATITIS-ASSOCIATED, AUSTRALIA ANTIGEN LIVER DISEASE. *(E.)* Dudley, F. J., Fox, R. A.; Sherlock, S. (Roy. Free Hosp. London, England). *Lancet* (7753):723-726, 1972.

0731 BILIRUBIN AND ENZYME VARIATIONS DURING THE DEVELOPMENT OF ACUTE HEPATITIS IN 20 CASES. *(Sp.)* Martinez-Falero, J. (Amb. Hermanos Miralles, Seguridad Social, Madrid, Spain). *Rev. Esp. Enferm. Apar. Dig.* 37(2):193-200, 1972.

0732 NEUROPATHY ASSOCIATED WITH HEPATITIS IN PATIENTS MAINTAINED ON HAEMODIALYSIS. *(E.)* Davison, A. M.; Williams, J. R.; Mawdsley, C.; Robson, J. S. (Univ. Edinburgh Roy. Infirmary, Scotland). *Br. Med. J.* (5797):409-412, 1972.

0733 PATHOLOGY OF VIRAL HEPATITIS. *(E.)* Weinbren, K.; Stirling, G. A. (U. Nottingham Med. Sch., England). *Br. Med. Bull.* 28(2):125-130, 1972.

0734 ANTIGEN IN INFECTIOUS HEPATITIS. *(E.)* Ferris, A. A. (Monash U. Alfred Hosp., Prahran, Victoria, Australia). *Br. Med. Bull.* 28(2):131-133, 1972.

0735 LABORATORY TESTS FOR AUSTRALIA (HEPATITIS-ASSOCIATED) ANTIGEN AND ANTIBODY. *(E.)* Taylor, P. E. (U. London Sch. Hyg. Trop. Med., England). *Br. Med. Bull.* 28(2):138-141, 1972.

0736 IMMUNOLOGICAL ASPECTS OF VIRAL HEPATITIS. *(E.)* Holborow, E. J. (Canadian Red Cross Mem. Hosp. Taplow, Maidenhead, Berkshire, England). *Br. Med. Bull.* 28(2):142-144, 1972.

0737 EPIDEMIOLOGY OF INFECTIOUS HEPATITIS. *(E.)* Rowland, A. J.; Skone, J. F. (Bristol City Dept. Health, England). *Br. Med. Bull.* 28(2):149-155, 1972.

0738 LABORATORY INVESTIGATION INTO THE ETIOLOGY OF HUMAN VIRAL HEPATITIS. *(E.)* Zuckerman, A. J. (U. London Sch. Hyg. Trop. Med., England). *Br. Med. Bull.* 28(2):134-137, 1972.

0739 HEPATITIS IN TRANSFUSION SERVICES. *(E.)* Maycock, W. d'A. (Lister Inst. Prev. Med., Elstree, England). *Br. Med. Bull.* 28(2):163-168, 1972.

0740 EARLY STUDIES OF VIRAL HEPATITIS. *(E.)* MacCallum, F. O. (Radcliffe Infirm., Oxford, England). *Br. Med. Bull.* 28(2):105-108, 1972.

0741 INDEPENDENCE OF INFECTIOUS AND SERUM HEPATITIS AND THEIR CLINICO-EPIDEMIOLOGICAL CHARACTERISTICS. *(Rus.)* Paktoris, Ye. A.; Sinayko, G. A.; Shakhgil'dyan, I. V. (D. I. Ivanovskiy Inst. Virol., Moscow, USSR). *Vestn. Akad. Med. Nauk SSSR* 27(6):64-73, 1972.

0742 CLINICAL AND PATHOGENIC SIGNIFICANCE OF PROTEIN METABOLISM ALTERATIONS OCCURRING IN CHILDREN WITH BOTKIN'S DISEASE. *(Rus.)* Nisevich, N. I.; Uchaykin, V. F.; Bokovoy, A. G.; Zubikova, I. I.; Zhil'tsova, G. V. (N. I. Pirogov Moscow Med. Inst., USSR). *Vestn. Akad. Med. Nauk SSSR* 27(5):85-91, 1972.

0743 CONTROL OF HEPATITIS IN DIALYSIS UNITS. *(E.)* Marmion, B. P.; Tonkin, R. W. (U. Edinburgh, Dept. Bact., Scotland). *Br. Med. Bull.* 28(2):169-179, 1972

0744 CYTOMEGALOVIRUS AND EB VIRUS INFECTIONS OF THE LIVER. *(E.)* Stern, H. (St. George's Hosp. Med. Sch., London, England). *Br. Med. Bull.* 28(2):180-185, 1972.

745 EPIDEMIOLOGY OF SERUM HEPATITIS. *(E.)* Cossart, Y. E. (Central Publ. Health Lab. olindale, London, England). *Br. Med. Bull.* 8(2):156-162, 1972.

746 EFFECT OF DEXTRAN 3000 ON THE SECRETORY EFFICIENCY OF THE LIVER IN HEALTHY SUB-ECTS AND PATIENTS WITH VIRAL HEPATITIS. *(Pol.)* Tkaczewski, W.; Matuszak, J.; Karasek, E. (Clin. Inf. Dis. Warsaw Acad. Med., Warsaw, Poland). *Pol. Tyg. Lek.* 27(3):86-88, 1972.

0747 AUSTRALIA ANTIGEN IN A CASE OF VIRAL HEPATITIS. *(Pol.)* Burczek, R.; Hiller, J. (Reg. Blood Transf. Ctr. Katowice, Poland). *Pol. Tyg. Lek.* 27(18):671-672, 1972.

0748 PROBLEMS OF FULMINANT HEPATIC FAILURE. *(E.)* Williams, R. (King's Coll. Hosp. Med. Sch., London, England). *Br. Med. Bull.* 28(2):114-119, 1972.

0749 THE COURSE OF LONG INCUBATION (VIRUS B) HEPATITIS. *(E.)* Sherlock, S. (U. London Roy. Hosp. Sch. Med., England). *Br. Med. Bull.* 28(2):109-113, 1972.

0750 HEPATITIS-ASSOCIATED ANTIGEN IN LIVER DISEASES. *(E.)* Chang, C.-K.; Shih, P.-L.; Sung, J.-L. (Dep. Int. Med. Clin. Pathol., Nat. Taiwan Univ. Coll. Med., Taiwan). *J. Formosan Med. Assoc.* 71(3):146-159, 1972.

0751 HEPATITIS-ASSOCIATED ANTIGEN IN BLOOD DONORS IN KENYA. *(E.)* Parker, A. M.; Muiruri, K. L.; Preston, J. K. (Dep. Med. Physiol., Univ. Nairobi, Kenya). *E. Afr. Med. J.* 48(9):470-475, 1971.

0752 RECOVERY OF AUSTRALIA ANTIGEN FROM HUMAN PLASMA PRODUCTS SEPARATED BY A MODIFIED COHN FRACTIONATION. *(E.)* Berg, R.; Bjoerling, H.; Bernstein, K.; Espmark, A. (Statens Bakteriol. Lab., AB Kabi, Stockholm, Sweden). *Vox Sang.* 22:1-13, 1972.

0753 INCIDENCE OF AUSTRALIA ANTIGEN IN THE HOSPITALIZED POPULATION AND DURING CIRRHOSIS AND CANCER OF THE LIVER IN AFRICANS FROM DAKAR. *(Fr.)* Sankale, M.; Seck, I. (Fac. Med. Pharm. Dakar, Senegal). *Bull. Soc. Pathol. Exot.* 64(6):821-827, 1971.

0754 CURRENT KNOWLEDGE REGARDING THE EPIDEMIOLOGY OF VIRAL HEPATITIS. *(Ger.)* Weise, H.-J. (Bundesgesundheitsamt, Max-von-Pettenkofer-Inst., Berlin, Germany). *Z. Allgemeinmed.* 48(8):365-369, 1972.

0755 NEW THERAPEUTIC APPROACH TO VIRAL HEPATITIS IN CHILDREN. *(Fr.)* Combe, P.; Fauchier, C.; Regy, J. M. (Center Pediat. Gatien Clocheville, Tours, France). *Therapeutique* 48(3):239-242, 1972.

0756 HEPATITIS IN PRISONER BLOOD DONORS. *(E.)* Krotoski, W. A. (Sect. Primate Malaria, Chamblee, Ga.). *New Engl. J. Med.* 286(3):159, 1972.

0757 AUSTRALIA (S.H.) ANTIGEN IN LIVER: NECROPSY FINDINGS IN SWITZERLAND AND TANZANIA. *(E.)* Krech, U.; Sonnabend, W.; Jung, M.; Meinecke, R.; Schmid, H. (Inst. Bacteriol., Inst. Pathol., St. Gall, Switzerland). *Lancet* (7742):148, 1972.

0758 AUSTRALIA ANTIGEN AND AUSTRALIA ANTIBODY CARRIERS IN THE HEALTHY POPULATION. Frey-Wettstein, M. (Blood Donor-Center, Limmattal, Schlieren, Switzerland). *Schweiz. Med. Wochenschr.* 102(15):534-540, 1972.

0759 AUSTRALIA ANTIGEN AND "HEPATITIS" IN HEMODIALYSIS UNITS. *(Ger.)* Weber, K. B.; Grob, P. J. (Dep. Inn. Med. Univ. Zurich, Switzerland). *Schweiz. Med. Wochenschr.* 102(15):529-534,1972.

0760 PRIMARY HYPERPARATHYROIDISM AGGRAVATED BY VIRAL HEPATITIS. *(Fr.)* Burckhardt, P.; Ruedi, B.; Magnent, P. (Clin. Med. Hop. Cantonal, Lausanne, Switzerland). *Schweiz. Med. Wochenschr.* 102(15):364-367, 1972.

0761 CHANGES IN THE SERUM ANGIOTENSIN CONCENTRATION IN ACUTE HEPATITIS AND LIVER CIRRHOSIS. *(Ger.)* Wernze, H.; Seki, A.; Michel, H. (Med. Univ.- Klin. Wuerzburg, Germany). *Klin. Wochenschr.* 50:53-55, 1972.

0762 THE SIGNIFICANCE OF HEPATITIS-ASSOCIATED ANTIGEN (Au/SH). *(Ger.)* Geserick, G. (Inst. Gerichtl. Med., Humboldt-Univ., Berlin, Germany). *Z. Gesamte Inn. Med.* 26(22):701-710, 1971.

0763 CURRENT PROBLEMS IN HEPATITIS CONTROL. *(Ger.)* Krieg, D.; Weigl, E. (Inn. Abt. Ver. Gesundheitseinrichtungen, Eisenhuettenstadt, Germany). *Z. Gesamte Inn. Med.* 27(1):25-30, 1972.

0764 AUSTRALIA ANTIGEN IN SINGAPORE. II. DIFFERENTIAL FREQUENCY IN CHINESE, MALAYS AND INDIANS. *(E.)* Yap, E. H.; Ong, Y. W.; Simons, M. J.; Okochi, K.; Mayumi, M.; Nishioka, K. (WHO Immunol. Res. Training Center, Fac. Med., Univ. Singapore, Blood Transfus. Serv., Univ. Hosp., Hongo, Tokyo, Japan). *Vox Sang.* 22:371-375, 1972.

0765 FECAL AUSTRALIA ANTIGEN AND HEPATITIS. *(Ger.)* Jemelka, H. I.; Grob, P. J. (Med. U. Klin. Zurich, Switzerland). *Helv. Med. Acta* 36(2/3):222-224, 1972.

0766 DEGENERATION OF LIVER MITOCHONDRIA IN VIRAL HEPATITIS. ITS MEANING AND IMPORTANCE. *(Fr.)* Pavel, I.; Petrovici, A. (Inst. Endocrinol. Acad. St. Med. Rom., Bucharest, Rumania). *Rev. Roum. Med. Int.* 9(1):15-21, 1972.

0767 IMMUNE COMPLEXES IN VIRAL HEPATITIS. FULMINATING HEPATITIS. *(Fr.)* Guardia, J.; Martinez-Vazquez, J. M.; Marsal, J.; Ferragut, A.; Bacardi, R. (Ciudad Sanit. Sec. Soc. Barcelona, Spain). *Nouv. Presse Med.* 1(26):1763-1768, 1972.

0768 INFECTIOUS HEPATITIS IN PREGNANCY: EPIDEMIOLOGICAL AND CLINICAL FEATURES. *(Ser.)* Cholakovic, B.; Dragovic, D.; Vuchelic, M. (Kosovska Mitrovica Med. Ctr., Kosovska Mitrovica, Yugoslavia). *Med. Pregl.* 25(5):181-185, 1972.

See also 0228, 0230, 0231, 0261, 0773, 0779, 0791, 0796

LIVER AND BILIARY TRACT

Chronic Hepatitis

0769 CHRONIC ACTIVE HEPATITIS IN CHILDREN. *(E.)* Dubois, R.S.; Silverman, A.; Slovis, T.L. (Univ. Colorado Med. Cent., Denver, Colo.). *Am. J. Dig. Dis.*, 17(7):575-582, 1972.

A report is presented on 28 children with chronic hepatitis. The majority were diagnosed within the last 5 years. Their presenting symptoms were usually indistinguishable from those of acute viral hepatitis (63%). Extrahepatic manifestations were more common in those patients with an insidious onset. All had sporadic cases without known exposure or secondary spread. The 19 patients tested for hepatitis-associated antigen (HAA) were all negative and SGOT values were higher (mean, 1080 IU/liter) than those reported in adult patients with chronic active hepatitis. Twenty-seven patients had marked elevation of serum gammaglobulin (mean, 4.04 g/100 ml) and 42% had positive LE cells. All patients had histologic features of "aggressive" hepatitis; in addition, five biopsies also showed areas of submassive lobular necrosis. The initial response to corticosteroid therapy was excellent in all but 3 patients. To date, drug therapy has been suspended in 4 patients for periods of 4 months to 2 years without clinical or biochemical relapse. There have been 4 deaths while on therapy, 2 with hepatic insufficiency and 2 with sepsis. One patient with terminal liver disease underwent orthotopic liver transplantation and subsequently died.

0770 CHRONIC LIVER DISEASE IN ASYMPTOMATIC NARCOTIC ADDICTS. *(E.)* Cherubin, C. E.; Rosenthal, W. S.; Stenger, R. E.; Prince, A. M.; Baden, M.; Strauss, R.; McGinn, T. G. (Dept. of Med., New York Med. Coll., New York, N. Y.). *Ann. Int. Med.* 76(3):391-395, 1972.

The liver sections obtained from 44 consecutive autopsies of addicts, none of whom died of liver disease, were compared with those from 28 age-matched nonaddict controls and from 28 controls with gross liver abnormalities. Former addicts in a rehabilitation program were followed with liver function and SH/Australia antigen tests; 16 liver biopsies were obtained. Twelve of the active addicts had chronic aggressive hepatitis; 10 had chronic persistent hepatitis; and 14 had nonspecific reactive hepatitis. In both control groups, most had normal livers, fatty change, or cirrhosis. In the 16 former addicts, with persistently elevated serum glutamic-pyruvic transaminase values or SH/Au antigenemia for 8 months or more after the cessation of drug use, only 3 liver biopsies were normal; the rest showed abnormalities similar to those of the autopsied addicts. The data suggest that a minority of addicts develop histologically severe chronic hepatitis. Most, however, have a moderate histological abnormality that probably continues for an extended period even after cessation of drug use.

0771 CHRONIC LIVER DISEASE AND MITOCHONDRIAL ANTIBODIES: A FAMILY STUDY. *(E.)* Walker, J.G.; Bates, D.; Doniach, D.; Ball, P.A.J.; Sherlock, S. (Middlesex Hosp., London WIP 9PG, England). *Br. Med. J.* (5793):146-148, 1972.

Two sisters are presented in whom primary bilary cirrhosis was diagnosed. Both had the disease in association with autoimmune thyroiditis with high titers of mitochondrial and other autoantibodies. Their mother possibily suffered from similar disorders. Two brothers had multiple autoimmune reactions, including mitochondria, but liver function tests were normal. Australian antigen was not detected in the sisters or their relatives.

0772 INTERRELATIONS OF HEPATITIS B ANTIGEN AND AUTOANTIBODIES IN CHRONIC IDIOPATHIC LIVER DISEASE. *(E.)* Finlayson, N.D.C; Krohn, K.; Anderson, K.E.; Jokelainen, P.T.; Prince, A.M. (Cornell Univ. Med. Col. New York, N.Y.). *Gastroenterology* 63(4):646-652, 1972.

Determinations of hepatitis B (HB) antigen and antibody in 94 patients with chronic idiopathic liver disease showed the presence of HB antigen in 18 cases (19%) with counterelectrophoresis and in 22 of 86 cases (26%) with passive hemagglutination inhibition. Autoantibodies to smooth muscle, mitohondria, or nuclei were present in 41 cases (44%). Both the HB antigen and HB antibody were detected in only 1 of these patients, and only 3 had both HB antigen and autoantibodies. These 3 patients included a male with chronic active hepatitis with an HB antigen that was detected only by the hemagglutination inhibition test and no cause for its presence could be found in the patient's history; a normal male blood donor in whom autoantibodies appeared transiently during an exacerbation of HB antigen-associated chronic liver disease; and a male with a history of "infectious hepatitis" who later developed HB antigen in association with an acute episode in the course of; cirrhosis which was associated with the smooth muscle antibody. These findings suggest that antimitochondrial antibody may develop in disease not associated with HB antigen.

0773 CLINICAL, BIOCHEMICAL, AND HISTOLOGICAL REMISSION OF SEVERE CHRONIC ACTIVE LIVER DISEASE: A CONTROLLED STUDY OF TREATMENTS AND EARLY PROGNOSIS. *(E.)* Soloway, R.D.; Summerskill, W.H.J.; Baggenstoss, A.H.; Geall, M.G.; Gitnick, G.L.; Elveback, L.R.; Schoenfield, L.J. (Mayo Clinic and Mayo Foundation, Rochester, Minn.). *Gastroenterology* 63(5):820-833, 1972.

A prospective, controlled, double-blind, randomized trial of treatments for severe chronic active liver disease was run on 63 consecutive patients chosen by predefined criteria. These included 15 patients who initially had subacute hepatitis with bridging, involving areas of necrosis with variable collapse extending between portal tracts or central veins; 17 patients with submassive necrosis involving extensive areas and collapse of multiple, adjacent lobules; and 7 patients with lesions of the bile ducts identical to those of cholangiolitic hepatitis. It was demonstrated that 20 mg/day prednisone or a combination of 10 mg/day prednisone and 50 mg/day azathioprine was superior to 100 mg/day azathioprine or placebo. Prednisone or a combination of 10 mg/day prednisone and 50 mg/day azathioprine significantly improved (1) life expectancy; (2) resolution to normal of clinical, biochemical, and immunochemical abnormalities; and (3) histological resolution from chronic active hepatitis, often with subacute changes, to nonspecific hepatitis. In contrast, clinical and biochemical deterioration usually occurred with azathioprine or placebo, although spontaneous remission occurred in 20% of patients receiving these treatments. Side effects with prednisone were common, and in 3 of 14 patients (21%) treated for more than 12 months, serious side effects (vertebral collapse, aseptic necrosis of the femoral head, or cataracts) made it necessary to discontinue prednisone. Azathioprine toxicity closely resembled the natural course of the disease. The prognosis could not be determined initially, since it depended upon the treatment employed.

0774 LYMPHOCYTE TRANSFORMING ACTIVITY IN THE SERUM OF PATIENTS WITH HEPATIC DISEASE. *(E.)* Kissling, M., Speck, B. (Academisch Ziekenhuis, Leiden, The Netherlands). *Vox Sang.* 21(3):261-268, 1971.

The blood serum of patients with hepatic disease was examined for its stimulating effect on normal peripheral blood lymphocytes cultured in vitro. In 25 out of 27 patients this serum stimulated lymphocyte transformation as determined morphologically and by increased uptake of ^{3}H-thymidine and ^{3}H-cytidine. Rapidly increasing RNA synthesis was found by methyl green pyronin staining during the first 24 hr of incubation. Autoradiography revealed DNA synthesis to be at its maximum between days 3 and 4. The behavior of the serum of patients found to be positive for Australia antigen and patients with other hepatic disease was comparable. It was demonstrated that the factor in serum which initiates lymphocyte transformation is in the globulin fraction. The early onset of changes indicates that the stimulus to lymphocyte transformation is nonspecific.

0775 CHOLESTASIS IN ACTIVE CHRONIC HEPATITIS. *(E.)* Cooksley, W. G.; Powell, L. W.; Kerr, J. F.; Bhathal, P. S. (Univ. Queensland, Roy. Brisbane Hosp., Australia). *Am. J. Dig. Dis.* 17(6):495-504, 1972.

0776 RAISED ANTIBODY TITRES TO MEASLES AND RUBELLA VIRUSES IN CHRONIC ACTIVE HEPATITIS. *(E.)* Triger, D. R.; Kurtz, J. B.; MacCallum, F. O.; Wright, R. (Radcliffe Infirmary, Oxford, England). *Lancet* (7752):665-667, 1972.

0777 CHRONIC AGGRESSIVE HEPATITIS. A STUDY OF 38 CASES. *(Sp.)* Wasserstein, M.; Kaufmann, P.; Grunwald, R. (Hosp. Clin. "Dr. Manuel Quintela", Montevideo, Uruguay). *Rev. Esp. Enferm. Apar. Dig.* 37(1):23-42, 1972.

0778 AUTOIMMUNE ASPECTS OF LIVER DISEASE. *(E.)* Doniach, D. (Middlesex Hosp. Med. Sch. London, England). *Br. Med. Bull.* 28(2):145-148, 1972.

0779 CHRONIC HEPATITIS. *(E.)* Wright, R. (U. Southampton Dept. Med., England). *Br. Med. Bull.* 28(2):120-124, 1972.

See also 0155, 0750

LIVER AND BILIARY TRACT

Alcoholic Liver Disease

0780 THE RECOGNITION OF HEMOLYTIC DISEASE IN PATIENTS WITH PORTAL CIRRHOSIS. *(E.)* Sherwood, W. C. (Penn-Jersey Regional Red Cross Blood Program, Philadelphia, Pa.). *Am. J. Clin. Pathol.* 57(5):618-624, 1972.

In order to determine the reliability of results of common laboratory tests as indicators of hemolytic disease in patients with chronic hepatitis disease, twenty-two patients with alcoholic hepatic disease were studied. Erythrocyte survival was compared with hemoglobin level, reticulocyte count, serum bilirubin, serum lactic acid dehydrogenase, and serum haptoglobin. Individual studies which had good reliability in indicating hemolytic disease in such patients were the indirect: total bilirubin ratio and serum haptoglobin levels. A stepwise regression analysis revealed that a reliable combination of studies to evaluate for the identification of hemolytic disease would comprise the indirectional bilirubin ratio, total-bilirubin, and haptoglobin values. Serum haptoglobin levels did not correlate with other measurements of hepatic protein synthesis (albumin, fibrinogen, prothrombin times—initial and mean). Thus haptoglobin synthesis can apparently remain intact in patients with chronic disease, and serum haptoglobin levels may be a reliable guide to the recognition of hemolytic conditions in such patients.

0781 HEPATIC HEMOSIDEROSIS AFTER PORTACAVAL SHUNT SURGERY IN ALCOHOLIC CIRRHOSIS: A SOMETIME THING. *(E.)* Koff, R.S.; Go, T.B.; Oliai, A. (VA Hosp., Boston, Mass.). *Gastroenterology* 63(5):834-836, 1972.

Hemosiderin was determined histochemically in liver sections from alcoholic cirrhotic men, obtained at the time of prophylactic or therapeutic portacaval shunt surgery, and again, on the average of 63 months later. Stainable iron was present in 10% of the initial and 18% of the follow-up sections and had increased from an average grade of 0.20+ to 0.36+. In this series hepatic hemosiderosis appeared to be an infrequent complication of portacaval anastomosis; the reasons for the differences from other studies are unclear.

0782 THE ROLE OF THE HEPATIC MICROSOMAL ETHANOL OXIDIZING SYSTEM (MEOS) FOR ETHANOL METABOLISM *IN VIVO*. *(E.)* Lieber, C.S.; DeCarli, L.M. (VA Hosp., Bronx, N.Y.). *J. Pharmacol. Exp. Ther.* 181(2):279-287, 1972.

An improved assay procedure was developed to assess the *in vivo* role of the microsomal ethanol oxidizing system (MEOS). When corrected for losses of microsomes during the preparation, the activity of the microsomal ethanol oxidizing system *in vitro* cor-

responded to 20 to 25% of the *in vivo* rate of
ethanol metabolism in the rat and could account
for most of the residual ethanol metabolism after
inhibition of alcohol dehydrogenase by pyrazole.
Jnder these conditions, the apparent rate constant
of microsomal ethanol oxidation *in vitro* coincided
with the apparent rate constant of blood ethanol
lisappearance *in vivo*. Furthermore, administration
of ethanol to rats for 24 days increased blood
ethanol clearance, with a parallel rise in micro-
somal ethanol oxidation activity, whereas the
activities of alcohol dehydrogenase and catalase
remained unchanged or decreased. Barbiturate treat-
ment for four to five days also increased total
icrosomal ethanol oxidizing system activity in the
iver and this was accompanied by a moderate accele-
ation of blood ethanol clearance. The latter
ffect was masked however if significant amounts
f barbiturates were still present in the blood
hen ethanol was given. In addition, administration
f one dose of barbiturate slowed blood ethanol
learance and abolished its increase induced
y ethanol pretreatment, suggesting that barbiturates
nterfere with the metabolism of ethanol. In view
f the parallel increase of blood ethanol clearance
n *vivo* and microsomal ethanol oxidizing system
lays a significant role *in vivo*.

783 DEFECTIVE CHEMOTAXIS ASSOCIATED WITH A SERUM INHIBITOR IN CIRRHOTIC PATIENTS.
E.) DeMeo, A. N., Andersen, B. R. (Abraham
incoln Sch. of Med., U. of Ill., Chicago).
Engl. J. Med. 286(14):735-740, 1972.

eutrophilic chemotaxis, serum hemolytic complement
C) and the complement components C 1*q*, C 1*s*, C 3,
4, C 5 and C 3 proactivator were studied in 22
coholics with active liver disease. When normal
ukocytes were tested against activated cirrhosis
rum in a disposable miniaturized chemotaxis
amber, marked impairment of chemotaxis, was seen
th a mean count of 35 cells per high-power field,
ereas control sera gave 133 cells per high-
wer field. However, three of four patients'
lls tested with normal serum had a normal chemo-
ctic response. In 12 patients tested, C and C 3
vels were decreased. Five of six patients'
rums added to normal chemotactically active
rum inhibited the expected chemotactic response.
sein-induced chemotaxis, which is C independent
s also abolished by the serum of cirrhotic
tients. Differences in candidacidal properties
tween normal and cirrhotic sera were not
atistically signifcant. Defective chemotaxis may
lp explain the increased susceptibility to
fection in cirrhosis.

0784 THE CLINICAL-PATHOLOGIC SPECTRUM OF ALCOHOLIC HEPATITIS. *(E.)* Gregory, D. H.; Levi, D. F. (Albuquerque Veterans Hosp., N. Mex.). *Am. J. Dig. Dis.* 17(6):479-488, 1972.

0785 ALCOHOL-INDUCED ACUTE HEPATITIS. *(Sp.)* Mardomingo Varela, P.; Muro Gonzalez, J.; Ortiz Vazquez, J.; Serrano, J.; Mino F. J. (Ciudad Sanit. S.S. "La Paz", Madrid, Spain). *Rev. Esp. Enferm. Apar. Dig.* 37(3):317-330, 1972.

0786 EFFECTS OF CHRONIC ALCOHOL ABUSE ON THE CEREBROSIDE CONTENT AND FATTY ACID COMPOSITION IN THE HUMAN BRAIN. *(Ger.)* Lesch, P. (Medizinische Hochschule Hannover, Germany). *Klin. Wochenschr.* 50(13):663-665, 1972.

0787 EFFECTS OF CHRONIC ALCOHOL ABUSE ON THE LIPID AND CHOLESTEROL CONTENT IN THE HUMAN BRAIN. *(Ger.)* Lesch, P. (Medizinische Hochschule Hannover , Germany). *Klin. Wochenschr.* 50(5):269-270, 1972.

0788 PERCUTANEOUS LIVER BIOPSY PERFORMED ON CHRONIC ALCOHOLICS HOSPITALIZED IN A PSYCHIATRIC UNIT. *(Por.)* Goncalves, C. S.; Lima Pereira, F. E.; Buaiz, V.; Zanotti, W. M.; Zanandrea, B.; Santos, U. M. (U. Federal do Espirito Santo , Fac. Med., Sao Paolo, Brazil). *Arq. Gastroenterol.* 9(1):5-10, 1972.

0789 THE INCIDENCE OF FATTY LIVER IN BIOPSY MATERIAL. *(Ger.)* Kuhn, G.; Niedobitek, F. (Pathol. Inst. Med. Akad. Luebeck, Germany). *Z. Gastroenterol.* 10(3):181-188, 1972.

0790 HEPATIC FUNCTION TESTS AND INDOCYANINE GREEN (ICG) RETENTION IN ALCOHOLICS. *(Jap.)* Komatsubara, K.; Kanie, F.; Kurokawa, A.; Mizutani, T.; Irino, K.; Ishikawa, T. (2nd Dep. Int. Med., Nagoya City Univ. Med. Sch., Nagoya, Japan). *J. Nagoya City Univ. Med. Assoc.* 22(4):599-606, 1972.

See also 0805

LIVER AND BILIARY TRACT

Cirrhosis

91 COINCIDENTAL AUSTRALIA ANTIGENEMIA IN PRIMARY BILIARY CIRRHOSIS. *(E.)*
ldrey, W.C.; Saito, S.; Shulman, N.R.; Klatskin,
(Yale Univ. Sch. Med., New Haven, Conn.). *Ann.*
ern. Med. 76:705-709, 1972.

Australia antigen and antibody were sought in the serums of 97 patients with primary biliary cirrhosis to investigate the role of the long-incubation hepatitis virus in the pathogenesis of the disease. Techniques used included immunodiffusion, immunoelectroosmophoresis, complement fixation, hemagglutination, hemagglutination inhibition, and electron microscopy. Australia antigen was detected in five (5%) of the group—by immunoelectroosmophoresis and complement fixation in one, by complement fixation alone in one, and by hemagglutination inhibition alone in three. Of the five Australia antigen positive patients, all had undergone laparotomy, and three had received blood transfusions before serum sampling. Australia antibody in low titer was demonstrated by hemagglutination in 12 (12%) of the group, but this was not considered significant, since neither the incidence nor the titer differed from those in 589 healthy controls. All other tests for Australia antigen and antibody showed negative results. The results suggest that the serum hepatitis virus is not implicated in the pathogenesis of primary biliary cirrhosis and that the occasional occurrence of Au antigen in the serum of such patients is attributable to coincidental, asymptomatic intercurrent infections with the virus.

0792 UNSATURATED MONOHYDROXY BILE ACIDS IN CHOLESTATIC LIVER DISEASE.

(E.) Murphy, G.M.; Jansen, F.H.; Billing, B.H. (Roy. Free Hosp., London, England). *Biochem. J.* 129(2):491-494, 1972.

Conjugated monohydroxy bile acids were isolated and identified from the pooled serum of 5 patients with primary biliary cirrhosis (fraction A); from the urine of a patient with biliary atresia (fraction B) and a patient with primary biliary cirrhosis (fraction C); and from the duodenal aspirate of a patient with primary biliary cirrhosis. After hydrolysis with a crude preparation of cholylglycine hydrolase from *Clostridium welchii*, free bile acids were subjected to thin-layer chromatography on silica gel with iso-octane:diisopropyl ether:acetic acid:propan-2-ol (2:1:1:1). These acids were also methylated with 0.7M HCl in methanol at 50°C overnight, and the resulting esters were separated by thin-layer chromatography on silica gel with acetone:benzene (3:7). Acetylated methyl esters were isolated by thin-layer chromatography on silica gel with methanol:chloroform (1:3). Methyl esters of fractions A, B, and D and the acetylated methyl ester of fraction A were subjected to mass-spectral analysis, and trimethylsilyl derivatives of methyl esters of fractions A, B, and C were prepared and subjected to gas-liquid chromatography and to a combination of gas-liquid chromatography and mass-spectral analysis. About 90% of fraction A apparently consists of 3β-hydroxychola-5,22-dienoic acid. This is the first report of an unsaturated monohydroxy bile acid in serum from patients with cholestatic liver disease. The mass spectrum of fraction B suggests that the methyl ester obtained from this fraction is 3β-hydroxychol-5-enoic acid, but other ionic fragments were present (lithocholic acid and an unidentified compound). Only fraction C contained lithocholic acid as the major bile acid, and fraction D contained taurolithocholic acid.

0793 MITOCHONDRIAL AND OTHER TISSUE ANTIBODIES IN RELATIVES OF PATIENTS WITH PRIMARY BILIARY CIRRHOSIS.

(E.) Feizi, T., Naccarato, R.; Sherlock, S.; Doniach, D. (The Middlesex Hospital, London, England). *Clin. Exp. Immunol.* 10(4):609-622, 1972.

Serologically, primary biliary cirrhosis resembles the "non-organ-specific" group of autoimmune disorders. A familial occurrence has not previously been described. Clinical and immunological studies were made on 126 close relatives of twenty-seven patients with primary biliary cirrhosis and in healthy controls matched with them for age and sex. An increased incidence of thyroid disorders was found in the patients and their families, and in each of two families there were two members with overt chronic liver disease. Mitochondrial antibodies, which were present in twenty-six of the twenty-seven probands, were also found in one sister with liver disease and in 7% of healthy relatives, while none of the controls reacted in the test. There was also a slight increase in nuclear and gastric parietal cell antibodies. Certain autoantibodies were strikingly clustered in some of the families. Serum immunoglobulins, measured in ninety-two relatives, showed a few instances of raised levels; some relatives had abnormally low values in the IgG, IgA and IgM classes. A familial or genetic abnormality of the immune responses thus appears to be one of the predisposing factors in the development of primary biliary disease.

0794 HEREDITARY HEMORRHAGIC TELANGIECTASIA PRESENTING WITH PORTAL HYPERTENSION AND CIRRHOSIS OF THE LIVER.

(E.) Feizi, O. (The Royal Free Hosp., London, England). *Gastroenterology* 63(4):660-664, 1972.

One of the few cases of hereditary hemorrhagic telangiectasia associated with hepatic cirrhosis is reported in which sufficient evidence was available to exclude reasonably known causes of chronic liver disease. The development of cirrhosis may have been a direct result of hereditary hemorrhagic telangiecta In support of this view it was noted that not only was there very extensive involvement of the liver by telangiectatic malformations, but that, in addition, these malformations were found within the fibrous septa in the liver. It is suggested that the cirrhosi in hereditary hemorrhagic telangiectasia may be the result of extensive involvement of the liver by telangiectases although no definite cause and effect conclusions can be reached.

0795 CIRRHOSIS AND DEATH AFTER JEJUNOILEAL SHUNT.

(E.) McGill, D.B.; Humpherys, S.R.; Baggenstoss, A.H.; Dickson, E.R. (Mayo Clinic and Mayo Foundation, Rochester, Minn.). *Gastroenter* 63(5):872-877, 1972.

Hepatic failure has not been previously reported afte jejunoileal shunts for obesity although a high risk of liver damage was found after jejunocolic anastomos A 39-year-old woman who underwent jejunoileal anastomosis is described. At operation, the liver was gros normal. Microscopically, there were only mild fatty changes and round cell infiltration in occasional portal spaces. Eleven months later, liver failure developed and the shunt was taken down; at autopsy, there was severe micronodular cirrhosis. The inability of the liver to deal optimally with the large amount of fat mobilized after such shunts might be related to a relative deficiency of some essential nutrient. Patients with jejunoileal shunts should be monitored carefully, and liver biopsies performed as needed during the first postoperative year.

0796 ASANGUINEOUS HYPOTHERMIC TOTAL BODY PERFUSION (TBW) IN THE TREATMENT OF STAGE IV HEPATIC COMA. *(E.)* Klebanoff, G; Hollander, D; Cosimi, A.B.; Stanford, W.; Kemmerer, W. T. (Wilford Hall USAF Med. Center, Lackland Air Force Base, Texas 78236). *J. Surg. Res.* 12(1):1-7, 1972.

A 49-yr-old male alcoholic in stage IV hepatic coma was subjected to a clinical trial of total body perfusion with crystalloid at a core temperature of 21°C esophageal and 25°C rectal. After rewarming, cardiac electrical activity returned spontaneously, although it was not identical to that before perfusion. The patient began to move spontaneously and react to deep pain stimuli 6 hr after perfusion. Bilirubin, blood urea nitrogen, alkaline phosphatase, and SGOT values decreased considerably, and 8 hr after completion of the procedure the patient became responsive. Urinary output, which had been low before perfusion, increased to 600 ml/4 hr. Liver function became stable and compatible with survival until the patient died of respiratory failure resulting from *Klebsiella pneumoniae* sepsis and pneumonia. Terminally, the urinary output decreased sharply and the coma deepened rapidly. Systolic hypotension did not respond to massive steriod and pressor therapy. A retrospective examination of the procedure used in total body perfusion suggests that the patient's anasarca may have been aggravated by the use of a crystalloid perfusate; fluid overload might have been avoided if a colloid were present in the perfusate. The use of curare should be avoided, and maximum advantage should be taken of increased diuresis after perfusion to eliminate excess fluid; Furosemide therapy is recommended.

0797 PROTEIN PATTERN OF THE THORACIC DUCT LYMPH IN NORMAL SUBJECTS AND IN PATIENTS WITH LIVER CIRRHOSIS. *(Ger.)* Schumacher, K., Wehmer, U.; Koch, W.; Schneider, W.; van de Loo, J.; Gross, R. (Med. Universitaetsklinik, Cologne, Germany). *Klin. Wochenschr.* 50(2):86-91, 1972.

Several methods were employed in characterization of the proteins of the thoracic duct lymph and blood serum from seven patients with liver cirrhosis and from normal persons. The methods included protein determination and electrophoresis on polyacrylamide gel, as well as immunological and enzymatic methods. Differences between lymph and blood sera were observed. The lymph sera showed a low IgM content, n some cases elevated IgA content, high albumin oncentration, and altered LDH-isoenzyme patterns. n some pathological lymph sera high concentrations of soluble protein from the liver and a glyco-eptide were found. The protein concentration in he lymph from cirrhosis patients varied markedly, whereas the protein content of the blood serum from these patients was normal or slightly elevated. The albumin content of the lymph sera from cirrhosis patients was depressed, and the albumin content of the blood serum from these patients was even further reduced.

0798 KINETICS OF RIFAMPICIN AND ISONIAZID ADMINISTERED ALONE AND IN COMBINATION TO NORMAL SUBJECTS AND PATIENTS WITH LIVER DISEASE. *(E.)* Acocella, G.; Bonollo, L.; Garimoldi, M.; Mainardi, M.; Tenconi, L. T.; Nicolis, F. B. (Res. Lab., Lepetit Group, Milan, Italy). *Gut* 13:47-53, 1972.

0799 INFANTILE CIRRHOSIS ASSOCIATED WITH *DE NOVO* PRODUCTION OF ALPHA-FETOPROTEIN. NEW PERSPECTIVES IN HEREDITARY TYROSINEMIA. *(Fr.)* Belanger, L.; Belanger, M.; Larochelle, J. (Hop. Chicoutimi Inc., Quebec, Canada). *Nouv. Presse Med.* 1(22):503-504, 1972.

0800 THE AUSTRALIA ANTIGEN IN HEPATIC CIRRHOSIS. *(Sp.)* Bruguera, M.; Maragall, S.; Caballeria, J.; Rodes, J.; Teres, J.; Castillo, R. (Hosp. Clin. Prov., Barcelona, Spain). *Rev. Clin. Esp.* 124(3):249-54, 1972.

0801 IMMUNOLOGIC EVALUATION OF PLASMINOGENS IN HEPATIC CIRRHOSIS PATIENTS. *(It.)* Pisarri, S.; Salsano, F. (Cattedra Semeiotica Med. Univ. Roma, Rome, Italy). *Progr. Med.* 28(24):24-26, 1972.

0802 STUDIES ON THE EFFECT OF A LIVER HYDROLYSATE ON THE HEPATIC CIRCULATION IN CHRONIC LIVER DISEASES. *(E.)* Ohbayashi, A.; Akioka, H.; Tazaki, H. (1st Dep. Int. Med., Osaka Med. Coll., Takatsuki-City, Osaka, Japan). *Arzneim. Forsch.* 22(3):578-82, 1972.

0803 PARENCHYMA WEIGHT CHANGES IN HEPATIC CIRRHOSIS. A MORPHOMETRIC STUDY AND DISCUSSION OF THE METHOD. *(E.)* Ludwig, J.; Elveback, L. R. (Mayo Clin. Mayo Found., Rochester, Minn.). *Lab. Invest.* 26(3):338-343, 1972.

0804 THE CLINICAL PICTURE OF MALABSORPTION IN CIRRHOTIC PATIENTS. *(Sp.)* Perez Peña, F; Arauzo Gonzalez, A. (Fac. Med. Madrid Hospital Clinico, Spain). *Rev. Esp. Enferm. Apar. Dig.* 37(4):447-458, 1972.

0805 FUNCTIONAL CORRELATIONS IN CIRRHOTIC PATIENTS. *(Sp.)* Morgante, P. E.; Kravetz, D. (Policlinico Prof. A. Posadas Haedo, Argentina). *Acta Gastroenterol. Latinoam.* 3(4):205-210, 1971.

0806 SALIVARY GLANDS AND THEIR RELATION TO LIVER CIRRHOSIS. *(Sp.)* Curi, C. A. (Policlinico Prof. A. Posadas, Haedo, Argentina). *Acta Gastroenterol. Latinoam.* 3(4):211-216, 1971.

0807 THE GLUCURONIC FRACTIONS OF BILIRUBIN IN HEPATIC CIRRHOSIS. *(Sp.)* Rodriguez Cuartero, A.; Mora Lara, R. J.; Duran Cara, E.; Pelaez Redondo, J. (Univ. de Granada, Spain). *Rev. Esp. Enferm. Apar. Dis.* 37(5):577-586, 1972.

0808 STRUCTURAL ALTERATIONS OF THE SMALL INTESTINE IN CIRRHOSIS. *(Sp.)* Salvioli, J. E.; Castelletto, H ; Olenchuk, A. (Univ. Nac. de La Plata, Argentina). *Rev. Esp. Enferm. Apar. Dig.* 37(2):167-174, 1972.

0809 DETERMINATION OF pH pCO_2, AND CO_3HNa IN ASCITES FLUIDS OF VARIOUS ETIOLOGY RELATIONS WITH THE BLOOD ACID-BASE FIGURES. *(Sp.)* Bustamante Bustamante, J.; Moreno Rodriguez, L. (Fac. Med., Valladolid, Spain). *Rev. Esp. Enferm. Apar. Dig.* 36(4):389-394, 1972.

0810 PROGNOSIS OF THE PORTACAVAL SHUNTS. *(Fr.)* Leger, L.; Lemaigre, G.; Lenriot, J.-P. (no affil.) *Bull. Acad. Nat. Med. (Paris)* 155(1-2): 36-44, 1971.

See also 0218, 0247, 0529, 0683, 0761, 0773, 0783

LIVER AND BILIARY TRACT

Gallbladder and Biliary Tract Diseases

0811 MECHANISM OF CHOLESTASIS. 6. BILE ACIDS IN HUMAN LIVERS WITH OR WITHOUT BILIARY OBSTRUCTION. *(E.)* Greim, H.; Trulzsch, D.; C ygan, P.; Rudick, J.; Hutterer, F.; Schaffner, F.; Popper, H. (Mt. Sinai Sch. Med., The City Univ. New York, New York, N.Y.). *Gastroenterology* 63(5):846-850, 1972.

The bile acid pattern was determined in 12 surgical biopsy specimens, and in four necropsy specimens of human liver by gas chromatography and solvolysis to detect sulfate esters of bile acid conjugates. In normal livers, cholic acid was usually the predominant one; only traces of lithocholic acid were found in 7 nonjaundiced patients and in 5 with obstructive jundice..In severe biliary obstruction, cholic acid rose significantly, whereas chenodeoxycholic acid rose only when cholestasis was protracted. In the patient with the most prolonged jaundice, chenodeoxycholic acid exceeded cholic acid. Lithocholic acid and bile acid sulfate esters comprised only a minor fraction of the total bile acids in cholestasis. The sume of deoxycholic acid and chenodeoxycholic acid parallels the degree of feathery degeneration as manifestation of cholestatic liver cell injury. It is assumed that the rise of cholic acid, which does not appreciably interact with the microsomal biotransformation system in contrast to the dihydroxylated bile acids, represents a transient protective mechanism in human extrahepatic biliary obstruction.

0812 CHOLECYSTITIS IN ADOLESCENTS. *(E.)* Crichlow, R. W., Seltzer, M. H.; Jannetta, P. J. (Sch. Med., Univ. Pennsylvania, Philadelphia). *Am. J. Dig. Dis.* 17(1):68-72, 1972.

0813 POSTOPERATIVE CHOLECYSTITIS. *(E.)* Howard, R. J.; Delaney, J. P. (Dept. Surg., Univ. Minnesota, Minneapolis). *Am. J. Dig. Dis.* 17(3):213-218, 1972.

0814 BENIGN NON-TRAUMATIC STRICTURE OF THE COMMON BILE-DUCT OWING TO PENETRATING DUODENAL ULCE *(E.)* Glick, S. (Winnipeg Gen. Hosp., Manitoba, Canada). *Br. J. Surg.* 58(12):918-920, 1971.

0815 SOME CURRENT TRENDS IN BILE SALT RESEARCH. *(E.)* Evrard, E. (Acad. Ziekenhuis St. Rafael, Leuven, Belgium). *Digestion* 5:108-115, 1972.

0816 GALLBLADDER CANCER WITH ALPHA-FETOPROTEIN. DISAPPEARANCE OF THE PROTEIN AFTER EXCISION OF THE TUMOR. *(Fr.)* Bernades, P.; Schlegel, N.; Potet, F.; Menache, D. (Hospital Beaujon, F92-Clichy, France). *Nouv. Presse Med.* 1(19):1297-1298, 1972.

0817 BENIGN CYSTIC TUMOR OF THE COMMON BILE DUCT LEADING TO INTERMITTENT JAUNDICE. *(Ger.)* Pross, E.; Schaefer, A.; Kuemmerle, F. (Chirurg. Klin. und Pathol. Inst., Univ. Mainz, Germany). *Leber Magen Darm* 2(3):104-108, 1972.

0818 COMBINED BACTERIOLOGIC STUDY OF THE GALLBLADDER, THE CHOLEDOCUS AND THE DUODENUM, IN BILIARY SURGERY. *(Fr.)* Stalport, J.; Letawe, P.; Rase, M. (B-5200 Huy, Belgium). *Acta Gastroenterol. Belg.* 34(1-2):23-34, 1972.

0819 SPHINCTEROPAPILLOTOMY MADE TO MEASURE. *(E.)* Ortiz, F. E. (Fac. Med. Sci., Univ. La Plata, Argentina). *Chir. Gastroenterol.* 6(2):175-181, 1972.

0820 GALLBLADDER CANCER. *(Fr.)* Chevrel, J. P. (Hospital Saint-Antoine, Paris, France). *Presse Med.* 79(52):2377-2379, 1971.

0821 UNUSUAL BILIARY TRACT ALTERATIONS. REPORTING FOUR CASES. *(Sp.)* Zaragoza Garcia, P. (Alcoy, Spain). *Rev. Esp. Enferm. Apar. Dig.* 37(3):379-384, 1972.

0822 PATHOLOGY OF THE GALLBLADDER STUMP. *(Sp.)* Miyar Gonzalez, A. (Oviedo, Spain). *Rev. Esp. Enferm. Apar. Dig.* 37(4):505-516, 1972.

0823 CHOLECYSTOPATHY. *(Sp.)* Arguelles, G. (Clinica Nuestra Senora del Carmen, Gijon, Spain). *Rev. Esp. Enferm. Apar. Dig.* 37(5):601-
518, 1972.

824 BENIGN DISEASES OF THE EXTRAHEPATIC BILE DUCTS. *(Sp.)* de Miguel, J. (Valladolid,
pain). *Rev. Esp. Enferm. Apar. Dig.* 37(5):587-
00, 1972.

825 A CASE OF DOUBLE GALL-BLADDER. *(E.)* Cantarelli, I.; Dell'osso, A.; Grassi, G.
.; Catarinacci, G. (Osp. S. Giovanni, Roma, Italy).
hir. Gastroenterol. 5(4):493-499, 1971.

826 CHOLESTEROSIS OF THE BILE DUCTS. *(Sp.)* Agusti Peypoch, J. A. (Hosp. Nuestra
enora Del Segrado Corazon, Spain). *An. Med.
arcelona)* 58(1):37-41, 1972.

827 COMMENTS ON 1,791 PRESURGICAL CHOLANGIOGRAPHIES PERFORMED BILIARY
THIASIS PATIENTS. *(Sp.)* Torres Torreblanca, E.
osp. Santa Cruz & San Pablo, Barcelona, Spain).
v. Esp. Enferm. Apar. Dig. 36(5):519-530, 1972.

28 LYMPHOCYTIC LYMPHOSARCOMA OF THE GALLBLADDER. *(E.)* Van Slyck, E. J.; Schuman,
M. (Dep. Med., Div. Hematol. Gastroenterol.,
nry Ford Hosp., Detroit, Mich.). *Cancer* 30(3):810-
6, 1972.

0829 VOLVULUS OF THE GALLBLADDER. *(E.)* Pinto, D. J. (Dep. Surg., Makerere Med. Sch., Kampala, Kenya). *E. Afr. Med. J.* 48(11):667-669, 1971.

0830 OPACIFICATION OF THE GALLBLADDER IN A CHILD FOLLOWING ADMINISTRATION OF UROGRAPHIC CONTRAST MEDIUM. *(E.)* Shea, T. E.; Pfister, R. C. (Dep. Radiol., Mass. Gen. Hosp., Boston, Mass.). *Pediatrics* 49(1):85-91, 1972.

0831 GALLSTONES: DIAGNOSIS AND TREATMENT. *(E.)* Small, D. M. (Boston Univ. Sch. Med., Boston, Mass.). *Postgrad. Med.* 51(1):187-193, 1972.

0832 TOTAL BILE ACIDS IN THE HEPATIC BILE. STUDIES IN THE POSTOPERATIVE PERIOD AFTER CHOLEDOCHOTOMY. *(Ger.)* Maurer, C.; Neiss, A. (Chirurg. Univ. -Klin. Heidelberg, Germany). *Z. Gastroenterol.* 10(3):189-196, 1972.

0833 GALLSTONES IN CHILDHOOD. *(It.)* Caramia, G.; Bruni, L.; Pirani, A. (Osp. Civ. Senigallia, Italy). *Minerva Pediatr.* 24(17):702-710, 1972.

0834 THE ACTION OF LIVER PARENCHYMAL ALTERATIONS ON THE COURSE OF REMISSION AFTER SURGERY FOR CHOLELITHIASIS. *(Pol.)* Prokopowicz, D. (Clin. Inf. Dis. Acad. Med. Bialystok, Poland). *Wiad. Lek.* 25(11):977-980, 1972.

0835 PROSPECTIVES IN THE THERAPY OF CHOLELITHIASIS. *(It.)* Greco, R. (U. Napoli, Naples, Italy). *Riforma Med.* 86(20):767-778, 1972.

0836 RESTORATION OF THE MAIN BILE DUCT AFTER ACCIDENTAL LESIONS PRODUCED DURING SURGERY. *(It.)* Aghina, A. (Osp. Pellegrini Di Napoli, Naples, Italy). *Rass. Int. Clin. Ter.* 52(9):521-528, 1972.

See also 0053, 0141, 0200, 0209, 0215, 0245, 0255,
0260, 0459, 0529, 0683, 0761, 0773, 0783

GENERAL

37 PERITONEAL LAVAGE TREATMENT IN EXPERIMENTAL PERITONITIS. *(E.)* Rosato, E. F.;
m-Smith, J. C.; Mullis, W. F.; Rosato, F. E.
iv. of Pennsylvania, Sch. of Med., Philadelphia).
. Surg. 175(3):384-387, 1972.

itonitis was produced in 41 dogs by means of an
lated avascular ileal loop. Fifteen dogs
eived only intravenous fluid treatment, resulting in a 100% mortality. Twenty-six dogs were treated with peritoneal dialysis and nine of these (35%) survived and returned to full health. Lavage served to remove both hemoglobin and bacteria, as judged by the dialysate color and bacterial counts. Each dog which died, except one, had significant peritonitis at autopsy. This was due to technical failure of the dialysis to remove large amounts of loculated fluid.

0838 THE GLOVE STARCH PERITONITIS SYNDROME. *(E.)* Ignatius, J.A.; Hartmann, W.H. (El Camino Hosp., Mountain View, Calif.). *Ann. Surgery* 175(3):388-397, 1972.

Cases of starch peritonitis are increasing in institutions using modified corn starch for surgical gloves. Thirteen cases of confirmed or clinically suspected starch peritonitis encountered in one hospital are reviewed with respect to symptoms, laboratory data, treatment, and clinical course. Manifestations of the disease in these patients included severe abdominal pain, fever, eosinophila, the presence of a mass, and severe ileus. Patients with suspected starch peritonitis responded favorably to corticosteroid treatment; however, six of seven patients with proven starch peritonitis were reoperated upon to rule out the possibility of major postoperative septic complication. Duration of morbidity was 2-6 wk for patients given corticosteroids and 5 months for surgically treated patients. The incidence of starch peritonitis, which may be a hypersensitivity reaction, can be reduced by meticulous removal of starch from gloves prior to an operation.

0839 SELECTIVE INTRAARTERIAL VASOPRESSIN IN THE TREATMENT OF UPPER GASTROINTESTINAL HEMORRHAGE. *(E.)* Conn, H.O.; Ramsby, G.R.; Storer, E.H. (Yale Univ. Sch. Med., New Haven, Conn.). *Gastroenterology* 63(4):634-645, 1972.

During the past 2 years intraarterial vasopressin has been used in 35 patients, one-third of whom were bleeding from esophageal varices and two-thirds from a variety of upper gastrointestinal sites. Hemorrhage from esophageal varices was controlled in 79% by the infusion of vasopressin into the superior mesenteric artery. Vasopressin infusion into the celiac axis or superselectively into its branches was effective in 82% of the episodes of nonvariceal bleeding. Simultaneous celiac and superior mesenteric arterial infusions were sometimes required to control bleeding. Infectious, cardiorespiratory, or vascular complications were observed in more than one-third of the patients. Spontaneous peritonitis and catheter-associated bacteremia were infectious complications which can probably be prevented by vasopressin infusions of shorter duration. Cardiac arrest, arrythmias, and other signs of the systemic effect of vasopressin are presumably preventable by slower rates of infusion. Extensive small bowel necrosis was encountered in one patient. Minor peripheral vascular complications were occasionally observed. Although these studies suggest that vasopressin is effective therapy, prospective controlled clinical trials are needed to establish the efficacy and safety of this new therapeutic tool in stopping hemorrhage and in improving survival.

0840 ISCHAEMIC LESIONS OF THE ALIMENTARY TRACT. *(E.)* McDonald, G.S.A.; Hourihane, D.O.B. (Sch. Pathol., Trinity Col., Dublin, Ireland). *J. Clin. Pathol.* 25(2):99-105, 1972.

Clinical and pathological findings are compared for 23 patients (10 men and 13 women, aged 39-83 yr) with nonocclusive ischaemic enterocolitis (NIE) and 13 patients (6 men and 7 women, aged 56-76 yr) with thrombosis of the superior mesenteric artery (TSMA). During the 2-yr period investigated, 13 cases of NIE and 13 cases of TSMA were autopsied out of a total of 2080 autopsies performed, an incidence of 0.6% for each condition. The average ages for both conditions were comparable: 66.1 yr for NIE and 66.6 yr for TSMA. The most common presenting symptoms for both conditions were abdominal pain, vomiting, and diarrhea. Of the 13 patients with NIE, 9 had rectal bleeding and 6 were in a state of collapse with hypotension, as were 3 patients with TSMA; none of the latter patients had rectal bleeding. Ischaemic enterocolitis was not associated with TSMA, although 3 patients had a potential source of embolus. Infarction with or without gangrene was present in 14 patients with NIE and in 10 patients with TSMA. Most of the lesions of NIE were distributec in a patchy manner in the small intestine and/or colon, whereas diffuse involvement of the small intestine was characteristic of TSMA. Coagulative necrosis involved only the mucosa in 12 patients with NIE and extended to involve the full thickness of the intestine in 8 patients. Fibrosis was associated with fresh infarction in 5 patients, suggesting previous episodes of ischaemia. Associated disease was diagnosed in 15 patients with NIE; cardiovascular disease was present in 10 cases. All 13 patients with TSMA had associated cardiovascular disease.

0841 PSYCHOMOTOR DEVELOPMENT OF INFANTS AND CHILDREN SUFFERING FROM TOXIC DIARRHEA. *(Pol.)* Dziewicka, A.; Bako, W.; Korzon, M. (Inst. Pediat., Acad. Med., Gdansk, Poland). *Pol. Tyg. Lek.* 27(3):88-90, 1972.

0842 USEFULNESS OF FIBRO-ESOPHAGO-GASTRO-DUODENOSCOPY IN EARLY DIAGNOSIS OF DIGESTIVE TRACT HEMORRHAGE. *(It.)* Montori, A.; Moscarini, M.; Viceconte, G.; Gaspari, A. (Instituto di Clinica Chirurgica Generale e Terapia Chirurgia (III), Univ. di Roma, Italy). *Progr. Med. (Rome)* 27:678-680, 1971.

0843 INTESTINAL AND PANCREATIC INVOLVEMENT IN SJOGREN'S SYNDROME. *(Por.)* Pinto de Moraes Filho, J. P.; Acras, S.; Neves, D. P.; Bettarello, A. (Inst. Gastroent., Sao Paolo, Brazil). *Arg. Gastroenterol.* 9(1):11-16, 1972.

0844 DIGESTIVE TRACT MANIFESTATIONS OF COLLAGEN SIS. *(Sp.)* Gonzalez Baron, M.; Jaramillo J. L.; Santiago Corchado M. (Ciudad Sanitaria "La Paz" de la Seguridad Social, Madrid, Spain). *Rev. Esp. Enferm. Apar. Dig.* 37(2):175-192, 1972.

0845 DIVERTICULAR DISEASE OF THE DIGESTIVE TRAC IN THE AGED. *(Sp.)* Miyar Gonzalez, A. (Oviedo, Spain). *Rev. Esp. Enferm. Apar. Dig.* 36(6) 707-734, 1972.

0846 IMMUNOLOGICAL MECHANISMS IN GASTROINTESTINAL DISEASES. *(Sp.)* Vilar Bonet, J. No affil.). *Rev. Esp. Enferm. Apar. Dig.* 36(4): 45-450, 1972.

847 THREE CASES OF COLLOID ADENOCARCINOMA OF THE DIGESTIVE TRACT: CANCER OF THE SOPHAGUS (DAWSON'S SYNDROME), OF THE STOMACH, AND F THE COLON. *(Sp.)* Barreiro, F.; Seco, J. L.; lvarez de la Marina, J. R.; Mateo, A.; Lopez opez, L. (Ciudad Sanitaria "La Paz", Madrid, pain). *Rev. Esp. Enferm. Apar. Dig.* 37(4):485-04, 1972.

848 EFFECT OF PHARMACEUTICAL FORMULATION ON GASTROINTESTINAL BLEEDING FROM ASPIRIN ABLETS. *(E.)* Leonards, J. R.; Levy, G. (Sch. arm., St. Univ. New York, Buffalo). *Arch. Intern. ed.* 129(3):457-60, 1972.

349 PRIMARY GASTROINTESTINAL LYMPHOMA. *(E.)* Kahn, L. B.; Selzer, G.; Kaschula, O. C. ed. Sch., Observatory, Cape Town, S. Afr.). *Am. Dig. Dis.* 17(3):219-232, 1972.

50 COMPUTER ANALYSIS OF SYMPTOM COMPLEXES IN PATIENTS HAVING UPPER GASTROINTESTINAL AMINATIONS. *(E.)* Ross, P.; Dutton, A. M. (Univ. chester, Sch. Med. Dent., Rochester, N. Y.). *. J. Dig. Dis.* 17(3):248-254, 1972.

51 CLINICAL EVALUATION OF ANISOTROPINE METHYL BROMIDE (VALPIN), AN ANTICHOLINER-C DRUG. *(E.)* Bachrach, W. H. (Cedars-Sinai Med. nter, Los Angeles, Calif.). *Am. J. Dig. Dis.* (6):505-512, 1972.

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See also 0195, 0243, 0598, 0900

GENERAL

Parasitology

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See also 0213, 0511

Numbers followed by an asterisk (*) refer to abstracts in the text. Other numbers refer to citations.

AUTHOR INDEX

AAGAARD, P.
0220, 0419
ABD-EL-SAMIE, Y.
0104
ABE, H.
0187
ABERNATHY, R.W.
0661
ABIVEN, M.
0709
ABOUNA, G.M.
0716*
ABRAHAMSSON, H.
0047*
ABU-DALU, J.
0874
ACCINNI, L.
0655*
ACOCELLA, G.
0798
ACRAS, S.
0843
ADIBI, S.A.
0022*
ADISESHIAH, M.
0636
ADLOFF, M.
0286
AFROUDAKIS, A.
0723*
AGARWAL, R.G.
0155
AGGARWAL, K.C.
0880
AGGARWAL, P.K.
0495
AGHINA, A.
0836
AGOSTI, A.
0452
AGUADE, J.P.
0676
AGUSTI PEYPOCH, J.A.
0826
AHO, A.J.
0540
AJDUKIEWICZ, A.B.
0722*
AKIOKA, H.
0802
AKUAMOA, G.
0282*
ALAGILLE, D.
0647
ALBERT, H.
0076
ALBERTINI, E.
0096
ALCALA-SANTAELLA, R.
0240
LEMANY ONTIVEROS, J.R.
0099
~~LI, M.V.~~
0037*
LIMOVA, L.A.
0100
LISON, F.
0702
LLEGRA, G.
0371*
LLEN, C.V.
0547
LLEN, J.R.
0097
ALLEYNE, G.A.O.
0862
ALMEIDA, A.Z.
0533*
ALONSO, A.
0111
ALVA C., J.J.
0857
ALVAREZ DE LA MARINA, J.R.
0378, 0847
AMDRUP, B.M.
0389
AMDRUP, E.
0374*
AMENT, M.E.
0433*, 0889
AMMANN, R.
0624
ANACKER, H.
0235
ANDERSEN, B.R.
0783*
ANDERSON, C.M.
0518
ANDERSON, K.E.
0772*
ANDRE, C.
0351
ANDRES, G.A.
0655*
ANELL, M.A.
0335
ANGELINI, G.
0448, 0642
ANOSHINA, A.A.
0136
ANSELL, I.D.
0655*
ANSELM, K.
0570
ANTHONY, P.P.
0717*
ANZINI, F.
0052
APARISI QUEREDA, L.
0400
APPERT, H.E.
0187
AQUARONE, D.
0285
ARAUZO GONZALEZ, A.
0804
ARBORELIUS, M.
0051
ARCINIEGAS, E.
0295
ARDILL, J.
0118
ARGUELLES, G.
0823
ARIANOFF, A.A.
0660
~~ARNOLD, K.~~
0668
ARRIBAS CASTRILLO, J.M.
0558
ARTIGAS, Y.
0402
ASOLE, F.
0449
ASTUDILLO, E.
0192
ATAMER, M.A.
0634*
AUBREY, D.A.
0087*
AURES, D.
0092*
AVIOLI, L.V.
0034
AZNAR LOPEZ, J.
0099
BABB, R.R.
0276
BACARDI, R.
0767
BACHMAIER, B.
0680
BACHRACH, W.H.
0851
BACON, H.E.
0576, 0594
BADEN, M.
0770*
BADER, J.P.
0524
BAGBY, R.F.
0481
BAGGENSTOSS, A.H.
0672, 0773*, 0795*
BAGUENA, J.
0340
BAGUENA CANDELA, J.
0204
BAKER, R.D.
0023*
BAKER, S.J.
0510
BAKO, W.
0841
BALASEGARAM, M.
0652*
BALINT, J.A.
0499
BALL, P.A.J.
0771*
BAMJI, M.S.
0175
BANCROFT, W.H.
0724*
BANK, S.
0500, 0884
BARAKAT, M.
0431*, 0650*
BARANY, F.
0345
BARASHKOVA, G.M.
0075
BARBARA, L.
0071
BARBEZAT, G.O.
0884
BARBIER, F.
0609
BARDYMOV, V.M.
0593
~~BARKER, L.F.~~
0717*
BARR, A.
0727
BARREIRO, F.
0847
BARREIRO ALVEREZ, F.
0378
BARROSO, F.L.
0418
BARTELHEIMER, H.
0234

BARTOSEK, I.
0142*
BARTTER, F.C.
0313*
BASERGA, R.
0081
BASS, A.G.
0473
BASS, P.
0074
BASSI, G.
0448
BASSO, N.
0338
BATES, D.
0771*
BATTISTI, G.
0258, 0259
BATTISTINI, C.
0621
BAYART, M.
0305
BAYER, M.
0132*
BEALES, J.S.M.
0641
BEAUDOIN, J.-G.
0166
BEAUDRY, R.
0496
BECKER, I.M.
0556
BECKER, J.-C.
0243
BEDNAR, B.
0244
BELANGER, L.
0799
BELANGER, M.
0799
BELDA SERNA, A.
0204
BELFASKY, R.B.
0314*
BELIN, R.P.
0575
BELSKY, J.L.
0350
BENAGES MARTINEZ, A.
0400, 0417
BENCIC, Z.
0879
BENTLEY, D.W.
0183*
BENTLIF, P.S.
0431*
BERENGUER, J.
0339, 0340, 0459
BERENGUER LAPUERTA, J.
0204
BERG, R.
0752
BERGEN, W.G.
0184
BERGENTZ, S.E.
0283
BERGNER, D.
0624
BERK, P.D.
0690*
BERK, R.N.
0018*, 0156
BERLIN, N.I.
0690*
BERMAN, H.
0242
BERMAN, P.M.
0569
BERNADES, P.
0816
BERNIER, J.J.
0019*, 0525, 0527, 0868
BERNSTEIN, K.
0752
BERSON, I.
0599
BERTACCINI, G.
0452
BERTISH, J.
0443
BETTARELLO, A.
0292, 0843
BETTER, O.S.
0170
BETTINI, V.
0072
BHAGWAT, A.G.
0011
BHAT, P.
0878
BHATHAL, P.S.
0775
BIANCHINE, J.
0708
BIERNAT, J.
0125, 0134
BIESTER, J.
0188
BIGARD, M.A.
0462
BIGOTTI, A.
0352
BILLE-BRAHE, N.E.
0389
BILLING, B.H.
0792*
BISMUTH, V.
0629
BISWAS, H.
0904, 0905, 0906
BITENSKY, M.
0154
BITOUN, A.
0868
BIZZI, A.
0142*
BJOERLING, H.
0752
BLASCHKE, T.F.
0690*
BLAZEK, O.
0244
BLERY, M.
0629
BLEVINGS, S.
0166
BLINDER, L.V.
0168
BLINOVA, O.A.
0300
BLOEMER, A.
0055
BLOMSTEDT, B.
0439
BLOOMER, J.R.
0690*
BLUMBERG, B.S.
0715*
BLUMENBERG, F.-W.
0584
BLYUGER, A.F.
0093
BOCHENEK, W.
0437
BOCK, O.A.A.
0403
BOGATYREVA, A.V.
0367
BOGNITSKAYA, T.N.
0592
BOKOVOY, A.G.
0742
BONFANTE, N.
0709
BONOLLO, L.
0798
BONOMA, C.
0110
BONOMO, G.M.
0384, 0637
BORDIER, P.
0527
BORDIER, PH.
0525
BOREK, B.
0314*
BORGSTROEM, S.
0051
BORINI, P.
0292
BORT, J.
0339
BORTOFF, A.
0063, 0064
BORTOLOTTI, M.
0071
BOTERO, D.
0899
BOTTERO, G.
0586
BOUCKAERT, J.
0877
BOULANGER, J.C.
0554
BOURDARIAS, J.
0632
BOURKE, J.B.
0209
BOUTELIER, PH.
0365
BOUTON, S.M.
0720*
BOYLE, I.T.
0026*
BRAGINSKIY, V.I.
0075
BRANCO RIBIERO, E.
0273
BRAND, G.
0076
BRATLID, D.
0694
BRAVO, C.
0899
BRECHTELSBAUER, H.
0152
BRIGGS, D.W.
0296
BRITT, L.G.
0109, 0195
BROOKS, F.P.
0110, 0120, 0227, 02

BROOKS, S.E.H.
0432*
BROWN, A.W.
0695
BROWN, B.H.
0068
BROWN, B.R.
0711
BROWN, C.
0572
BROWN, C.H.
0616
BROWN, C.L.
0209
BROWN, J.D.
0668
BROWN, J.W.
0281
BROWN, R.E.
0651*
BROWSE, N.L.
0641
BROYN, T.
0454
BRUGUERA, M.
0676, 0691, 0800
BRUNA, J.
0245
BRUNI, L.
0833
BRUNOVA, E.
0245
BUAIZ, V.
0788
BUCHANAN, K.D.
0118
BUCHIN, R.
0457
BUCHWALD, H.
0443
BUJNIEWICZ, E.
0210
UJOLD, R.
0588
URCKHARDT, P.
0760
URCZEK, R.
0747
URGESS, J.N.
0267*
URGUI, J.L.F.
0643
URHOL, P.G.
0091*
URKE, V.
0518
URLEY, D.M.
0705*
URNS, G.P.
0087*
USTAMANTE BUSTAMANTE, J.
0346
~~UTLER, B.A.~~
0316*
UTT, E.M.
0653*
UTTERFIELD, D.G.
0263*
BALLERIA, J.
0800
BRERO GOMEZ, F.
0398
CHIN, M.
0360
CADRANEL, S.
0877
CAGOL, P.P.
0266*
CAHLIN, E.
0144*
CALABRESE, L.
0115
CALLOWAY, D.H.
0179*
CALNE, R.Y.
0655*
CAMARRI, E.
0116
CAMERON, A.J.
0420
CAMPORINI, S.
0333
CAMPOS, J.V.M.
0507
CAMUS, J.P.
0527
CANNATA, B.
0111
CANTALUPO, C.
0448
CANTARELLI, I.
0825
CAPDEVILA-TORRA, A.
0561
CARAMIA, G.
0833
CARBALLO, J.
0187
CARENA, J.E.
0898
CARLBERGER, G.
0345
CARLIOZ, H.
0647
CARLSON, H.
0200*
CAROIT, M.
0525
CARON, J.
0299
CARON-POITREAU, C.
0299
CARRASQUER, J.
0459
CARREAU, J.-P.
0682
CARSWELL, F.
0486*
CASALOTS, J.
0885
CASARELLA, W.J.
0538*
CASAS CARNICERO, J.
0392
CASTELL, D.O.
0049*
~~CASTELLANOS FRANCO~~
0240
CASTELLETO, H.
0808
CASTELLETO, R.
0341
CASTELLETTO, R.H.
0335
CASTELLS, E.
0643
CASTILLIO, R.
0467
CASTILLO, R.
0800
CATARINACCI, G.
0825
CAUL, J.
0688*
CAVALLINI, G.
0642
CELERIER, M.
0868
CERBONET, G.
0468
CERF, M.
0242
CHABANEIX, G.
0326
CHACKO, C.M.
0143*
CHACON, J.P.
0333, 0421
CHAKRABORTY, P.
0900
CHAMBON, J.-P.
0589
CHAMLIAN, A.
0214
CHAN, Y.C.
0665
CHANDLER, A.M.
0668
CHANDLER, J.P.
0252
CHANG, C.-K.
0750
CHANG, F.M.
0375*
CHAPUY, H.
0249
CHATELAN, J.-L.
0353
CHATELIN, C.-L.
0590
CHAUSMER, A.B.
0145
CHAVRIER, Y.
0614
CHAZALETTE, J.P.
0614
CHEN, E.
0230
CHERUBIN, C.F.
0770*
CHEVREL, B.
0820
CHEVREL, J.P.
0820
CHEY, W.Y.
0107
CHHABRA, R.S.
0178
CHIPENS, G.I.
0075
~~CHIU, C.J.~~
0445
CHOLAKOVIC, B.
0768
CHOPRA, P.
0466
CHOQUART, PH.
0364
CHRISTANSEN, J.
0220
CHRISTENSEN, J.
0070

CHRISTIANSEN, J.
0419
CHRISTOFOROV, B.
0646, 0702
CHUA, L.B.
0689*
CHUNG, E.E.
0596
CHVASTA, T.E.
0319*
CIRENEI, A.
0552
CLARKE, E.W.
0073
CLARKE, R.J.
0365
CLASSEN, M.
0126, 0203, 0236, 0624
CLEATOR, I.G.M.
0251
COELLO-RAMIREZ, P.
0493*
COHEN, B.
0275*
COHEN, S.
0058
COHEN, W.N.
0477
COLEBOURNE, K.W.
0533*
COLIN, J.F.
0386
COLIN, R.
0591
COLLARINO, A.
0186
COLLIS, C.H.
0306
COMBE, P.
0755
CONDON, R.E.
0183*
CONN, H.O.
0839*
CONNELL, A.M.
0073, 0605
CONRAD, M.E.
0724*
CONRADI, H.
0405
CONWAY, J.D.
0165
COOK, P.
0306
COOKE, A.R.
0319*
COOKSLEY, W.G.
0775
CORAZZIARI, E.
0052
CORDIOLI, G.P.
0266*, 0336
CORLEY, L.D.
0485*
CORLIN, R.F.
0662
CORNELL, G.N.
0472
CORNIL, A.
0638
CORTESE, A.F.
0472
COSIMI, A.B.
0796*
COSIN AGUILAR, J.A.
0417
COSSA, J.F.
0326
COSSART, Y.E.
0745
COSSERMELLI, W.
0292
COTTON, P.B.
0641
COUGARD, A.
0214
COUINAUD, C.
0681
COURTECUISSE, V.
0647
COUSIN, J.
0305
COUTURE, J.
0588
COYNE, V.Z.
0715*
CRAIG, J.O.M.C.
0206
CRESPI, M.
0352
CRESPY, G.
0674
CRET, L.
0530
CRICHLOW, R.W.
0812
CROSSLEY, G.
0705*
CRUZ, F., JR.
0467
CRUZ, P.T.
0028
CSENDES, A.
0089*, 0368*
CUFLEY, G.A.
0480
CUNHA, A.
0458
CURI, C.A.
0806
CURRAN, P.F.
0035
CURRIE, D.J.
0011
CURTO CARDUS, J.
0557
CURTO CARDUS, J.A.
0438, 0560
CUSTER, R.P.
0715*
CZYGAN, P.
0141*, 0811*
DA COSTA, L.R.
0002*
DAHL, M.G.C.
0706*
DALLMAN, P.R.
0707*
D'ALONZO, D.
0116
DAM, H.
0148
DAMANIA, R.F.
0901
DAMMIN, G.J.
0517
DANAO, S.C.
0348
DANEMANN, H.
0480
DANIEL, A.M.
0166
DANIEL, E.E.
0060, 0061, 0062
DASHEVSKIY, YU.YA.
0455
DATTA, S.
0381
DAUCHEL, J.
0867
D'AURIA, D.
0372*
DAVIES, D.J.
0532*
DAVIS, P.W.
0541
DAVIS, W.D., JR.
0256
DAVISON, A.M.
0732
DAYAL, Y.
0473
DEBRAY, C.
0137, 0211, 0415
DE CARLI, L.M.
0782*
DE CARVALHO, C.
0458
DE CARVALHO WHITAKER, J.C
0421
DEFRENNE, P.
0202
DEFTOS, L.
0313*
DE JAGER, R.L.
0726
DE LA FUENTE GOMEZ, L.
0346
DE LA GANDARA, F.
0346
DELANEY, J.P.
0316*, 0377*, 0813
DE LA TOUR, J.
0137
DELEA, C.S.
0313*
DELL'ANNA, B.
0621
DELLA VOLPE, R.
0096
DELL'OSSO, A.
0825
DE LOR, J.
0484*
DEL RIO MARCO, F.
0872
DEL SOLDATO, G.
0553
DELUCA, H.F.
0026*
DEMBINSKA-KIEC, A.
0625
DE MEO, A.N.
0783*
DEMEULENAERE, L.
0659
DEMEULENAIRE, L.
0609
DE MIGUEL, J.
0390, 0824
DE MINJER, A.
0173

DEMLING, L.
0203, 0236, 0624
DEMOFONTI, A.
0167
DE MONTIS, G.
0196
DE NARDO, G.L.
0198*, 0233
DEN BESTEN, L.
0477
DENCKER, H.
0550
DENNING, C.R.
0628
DEN OTTER, G.
0587
DEN OTTER, W.
0173
DE OLIVEIRA, E.
0309
DE PAILLERETS, F.
0526
DE PENA PEREZ, R.
0297
DE PRADO SERRANO, R.
0417
DERACHE, R.
0182*
DESCHENES, L.
0588
DE SEZE, S.
0525, 0527
DES MESNARDS, G.
0469
DESMOND, A.M.
0317*
DESORGHER, G.
0305
DESVIGNES, G.
0422
DEUTSCH, E.
0852
E VECCHIS, A.
0866
DEVROEDE, G.
0482, 0496
E VORE, V.
0147
E VOS, M.
0659
EYHLE, P.
0203
IAZ, C.
0314*
IAZ VELASQUEZ, I.
0423
I CARO, A.
0355
ICKSON, E.R.
0795*
IETERICH, W.-R.
0218
~~IETZE, F.~~
0528
IETZMAN, D.E.
0720*, 0725*
IGIESI, V.
0366
I GIOVANNI, V.
0449
IMANT, N.E.
0199*
I MARTINO, C.
0167
DI MATTEO, S.
0352
DIMITROV, N.V.
0343
DIMITROVA, M.
0427
DIOP, A.
0464
DOBBINS, W.O., III
0430*
DOBREV, YA.
0875
DOBRILLA, G.
0642
DOHERTY, J.E.
0042
DOMMERGUES, J.-P.
0698
DOMSCHKE, W.
0126, 0624
DONALDSON, R.M., JR.
0181*
DONATO DE PROSPERO, J.
0876
DONIACH, D.
0722*, 0771*, 0778, 0793*
D'ONOFRIO, G.
0551
DOUMBE, E.
0674
DOWLING, B.L.
0610
DRAGOVIC, D.
0768
DRAGSTEDT, L.R.
0123
DRESSLER, K.
0141*
DREWES, V.M.
0069
DRIESSEN, G.
0152
DRY, J.
0632
DUANE, W.C.
0491*
DUBILIER, L.D.
0575
DUBOIS, R.S.
0040*, 0769*
DUBOST, C.
0868
DUBRASQUET, M.
0086*
DUCHON, G.
0061
DUDLEY, F.J.
0722*, 0730
DUEX, A.
0055
DUGAN, R.E.
0555
~~DUJOVNE, C.A.~~
0708
DUMONT, A.
0869
DUMONT, J.-C.
0869
DUNN, C.R.
0018*, 0156
DURAN, A.
0213
DURAN CARA, E.
0807
DUTHIE, H.L.
0068
DUTHOIT, D.
0869
DUTT, B.
0229
DUTTON, A.M.
0850
DVORAKOVA, H.
0244
DZIENIS, H.
0429
DZIEWICKA, A.
0841
EARLAM, R.J.
0548, 0893
EGAN-MITCHELL, B.
0492*
EILBAUM, M.
0324, 0359
ELEWAUT, A.
0609
EL-GENDI, M.
0104
ELLEGAARD, J.
0343
ELLIS, F.H.
0267*
ELLIS, M.I.
0882
ELLORY, J.C.
0027
ELSNER, I.
0601
ELVEBACK, L.R.
0773*, 0803
EMONS, D.
0489*, 0490*, 0516
ENGEL, C.
0076
ENSRUD, E.R.
0441
EPSTEIN, S.
0098
EPSTEIN, S.M.
0164
ESPIRITU, C.R.
0205
ESPMARK, A.
0752
ESPOSITO, G.
0448
ESSIET, G.
0315*
ETIENNE, J.
0629
ETIENNE, J.-P.
0702
EVRARD, E.
0815
FABBRUCCI, I.
0072
~~FAHRLAENDER, H.~~
0871
FAINARU, M.
0721*
FALK, G.
0314*
FARAH, A.
0629
FARAH, P.
0465
FARBER, E.
0164

FARMER, R.G.
0478, 0616
FAUCHIER, C.
0755
FAUCONNET, M.H.
0312*
FAVA, J.
0876
FEDOTOWA, O.
0435*
FEIFEL, G.
0102
FEIJOO CABALLERO, L.
0393
FEIZI, O.
0794*
FEIZI, T.
0793*
FELDMAN, R.A.
0878
FERDINANDUS, J.A.
0157
FERGUSON, A.
0486*
FERNANDEZ, D.
0272
FERNANDEZ-CRUZ, L.
0192
FERRAGUT, A.
0767
FERRANDO, J.
0339
FERRANDO, R.
0171
FERRANTE, W.A.
0256
FERREIRA MONTERO, V.
0193, 0872
FERRI, S.
0866
FERRIS, A.A.
0734
FERRIS, T.F.
0661
FERRO, V.
0261
FEYDIT, P.
0646
FICARRA, A.
0038*
FICINI, R.
0461
FIGUEIRA, A.
0309
FIGUEROA, E.
0111
FILIPE, M.I.
0537*
FINBY, N.
0347
FINLAYSON, N.D.C.
0312*, 0772*
~~FIREDELL, M.T.~~
0536*
FIROOZNIA, H.
0475
FISHER, J.
0484*
FISHER, L.MCA.
0716*
FISHER, R.G.
0600
FITZGERALD, P.J.
0130*
FLATZ, G.
0489*, 0490*, 0516
FLETCHER, W.S.
0547
FLOMAN, Y.
0890
FLOQUET, J.
0462
FOGEL, M.R.
0022*
FOKINA, A.A.
0075
FOLIOT, A.
0702
FOMIN, P.D.
0301
FONTANA, G.
0870
FONT PASCAL, J.A.
0557
FONT PASCUAL, J.A.
0560
FORBES, G.B.
0046
FOREMNY, Z.
0436
FORRESTER, J.M.
0090*
FORSTER, E.
0286
FOSTER, D.B.E.
0541
FOURATI, R.
0260, 0462
FOURLON, C.
0171
FOURNIER, A.
0305
FOUTS, J.
0178
FOX, R.A.
0722*, 0730
FOZ, M.
0643
FRANCOIS, R.
0530
FRANZ, H.E.
0012
FREEDMAN, M.A.
0442
FRENCH, A.B.
0498
FRESNEL, P.
0286
FREXINOS, J.
0001*, 0529
FREY-WETTSTEIN, M.
0758
FRIEDMAN, M.A.
0098
FRILEUX, C.
0364
FROLKIS, A.
0435*
FROM, E.
0712
FROMMER, D.
0654*
FRYCZKOWSKI, M.
0270
FUKUI, O.
0413
FURMAN, R.W.
0575
GABRYELEWICZ, A.
0361
GALAN HAVARRO, J.L.
0212
GALEVSKI, K.
0021*, 0044
GALIAN, A.
0583
GALLART-ESQUFRDO, A.
0863
GALLET, J.-P.
0526
GALY-MASCARO, C.
0676
GAMA RODRIGUES, J.J.
0285
GANDOLFI, L.
0870
GANGRADE, K.C.
0014
GANGULI, P.C.
0090*
GANROT, P.O.
0670
GARBAGNATI, E.
0692, 0703
GARCIA BARON, A.
0399
GARCIA BRAGADO, F.
0872
GARCIA-CONDE GOMEZ, F.J.
0400, 0417
GARCON, E.
0682
GARIMOLDI, M.
0798
GARLICK, F.H.
0388
GARNEAU, R.
0588
GARRIDO, G.
0340, 0459
GARTHOFF, L.
0147
GASBARRINI, G.
0685
GASPARI, A.
0842
GASPARYAN, S.A.
0168
GAUCHER, P.
0260, 0462, 0683
GAUTIER, M.
0682
GAUTIER-BENOIT, C.
0589
GEALL, M.G.
0773*
GEEVFRGHESE, P.J.
0639
GFLFAND, M.D.
0544
GENIESER, N.B.
0475
GFNTZ, J.
0671
GFORGATSOS, J.G.
0158
GFORGE, R.
0108
GFPTS, W.
0877
GFRBL, B.
0152

GERSON, C.D.
0005*
GERSTLEY, B.J.S.
0715*
GESERICK, G.
0762
GEUMIE, A.
0104
GHAHREMANI, G.G.
0264*, 0268*
GHALIB, E.
0064, 0855
GHOSH, B.C.
0330
GIACOMANTONE, O.
0341
GILAT, T.
0892
GIL EXTREMERA, B.
0505
GILLET, M.
0243
GINSBERG, A.L.
0724*
GIRARD, M.
0249
GITLIN, D.
0174
GITLIN, G.M.
0174
GITNICK, G.L.
0728, 0773*
GIULY, J.
0648
GLASER, P.
0022*
GLATSTEIN, E.
0198*, 0233
GLEESON, J.
0386
GLENNON, J.E.
0159
GLICK, S.
0814
GLINUKI, M.
0396
GLINSKA, A.
0396
GLOTZER, D.J.
0473
GO, T.B.
0781*
GOEBELL, H.
0624
GOLDENBERG, S.
0309
GOLDMAN, H.
0473
GOLDSMITH, H.S.
0330
GOLDSTEIN, F.
0517, 0571
GOLIGHER, J.C.
0373*
GOLUB, M.M.
0085*
GOLUBOV, I.S.
0093
OMPERTZ, M.L.
0109
ONCALVES, C.S.
0788
ONELLA, J.
0065
GONZALEZ BARON, M.
0844
GOODMAN, J.
0707*
GORAL, R.
0565
GORBACH, S.L.
0183*
GORDON, E.M.
0225
GORDON, E.S.
0159
GORMAN, R.
0154
GOSE, C.
0660
GOTI ITURRIAGA, J.L.
0393
GOTTLIEB, S.
0255
GOUDOTE, E.
0464
GOVAERTS, J.P.
0457
GOVI, D.
0870
GOYAL, R.K.
0224, 0650*
GRACEY, M.
0518
GRAM, T.E.
0178
GRANT, A.K.
0197*
GRASSI, G.B.
0825
GRASSI, G.B., JR.
0551
GRAY, R.W.
0026*
GRECO, R.
0835
GREENBERGER, N.J.
0017*, 0484*, 0661
GREGERSEN, G.
0663
GREGORY, D.H.
0480, 0784
GREGORY, M.M.
0706*
GREIDER, M.H.
0004*
GREIM, H.
0141*, 0811*
GRENET, P.
0526
GRIFFE, J.
0674
GRIFFEN
0582
GRIFFEN, W.O.
0575, 0581
GRIFFEN, W.O., JR.
0479
GRIGORESCU, A.
0274
GRIGOR'YEV, A.F.
0593
GROB, P.J.
0759, 0765
GROSS, R.
0797*
GROSSMAN, M.I.
0089*
GROSSOWICZ, N.
0021*, 0044
GRUBB, M.N.
0650*
GRUNWALD, R.
0777
GRZELEC, T.
0134
GRZLYWNA, W.
0697
GRZYBEK, H.
0697
GUAITANI, A.
0142*
GUARDIA, J.
0767
GUBERT, J.-P.
0526
GUELRUD, M.
0275*
GUERRE, J.
0646
GUIBERTEAU, M.J.
0224
GULI, E.P.G.
0532*
GULLO, L.
0129*, 0635*
GUNDMAND-HOYER, E.
0504, 0522
GUNTHER, H.
0218
GUPTA, B.K.
0511
GUPTA, K.D.
0155
GUPTA, P.R.
0495
GUPTA, R.K.
0466
GUPTA, S.R.
0904, 0905
GUPTE, S.P.
0495, 0880
GURD, F.N.
0445
GUTH, P.H.
0194, 0406
GUTMANN, R.A.
0324, 0359
GUY, S.K.
0602*
HABERMAN, R.
0892
HACKEL, D.B.
0028
HADAS, N.
0892
HADZIYANNIS, S.
0723*
HAEBERLE, M.G.
0479
HAGER-MALECKA, B.
0697
HAGLUND, U.
0189
HALGRIMSON, C.G.
0655*
HALL, M.G.
0596
HALL, P.
0370*
HALL, R.A.
0373*

HALL, W.H.
0042
HALTER, F.
0221
HAMEL DE MONTCHENAULT, H.
0324, 0359
HAMMOND, J.B.
0453
HANCZYCOWA, H.
0127
HANKIEWICZ, J.
0210
HANLEY, P.H.
0534*
HANSEN, L.K.
0222
HANSSON, B.-G.
0228
HARA, T.
0413
HARING, R.
0297
HARLAY, A.
0632
HARRISON, R.C.
0251
HART, D.M.
0296
HARTEMANN, E.
0614
HARTMAN, P.V.
0549
HARTMANN, W.H.
0838*, 0860
HASHIMOTO, T.
0413
HASIK, J.
0565
HATFIELD, A.K.
0661
HAWK, W.A.
0478
HAYES, J.R.
0118
HAYNIE, T.P.
0226
HEALD, R.J.
0542
HEALY, G.R.
0858
HEANEY, R.P.
0043
HEATON, J.W.
0036
HEBERT, S.
0172
HECHES, P.
0353
HECK, L.L.
0268*
HEIMANN, A.
0102
HEINONEN, R.J.
0540
HEISIG, A.
0489*, 0490*
HEISSMEYER, H.
0678
HELLEKANT, G.
0191
HELLSTROEM
0582
HELLSTROEM, I.
0578
HELLSTROEM, K.E.
0578
HENDERSON, R.M.
0061
HENNESSY, T.P.J.
0372*
HENRIQUEZ DE GAZTANONDO, C.A.
0438
HEPP, J.
0679
HERANI, B., JR.
0309
HERBERTSON, B.M.
0655*
HERMANS, P.E.
0329
HERMS, G.
0714
HERSH, T.
0224, 0650*
HESS, D.R.
0488*
HEULLY, F.
0260, 0683
HEWITT, W.L.
0728
HEY, E.N.
0882
HICKEY, C.A.
0179*
HIGHMAN, J.H.
0206
HILL, K.
0318*
HILLBOM, M.E.
0162
HILLER, J.
0747
HILLIER, A.P.
0150
HILLSON, R.F.
0477
HINES, C., JR.
0256
HIOCO, D.
0527
HIRSCHOWITZ, B.I.
0091*
HISLOP, I.G.
0197*, 0370*
HOBBS, C.
0481
HOFFER-JANKER, H.
0584
HOFMAN, K.
0686
HOFSTETTER, J.-R.
0908
HOLBOROW, E.J.
0736
HOLDSTOCK, D.J.
0411
HOLICK, M.F.
0026*
HOLLAND, P.V.
0231
HOLLANDER, D.
0796*
HOLLENDER, L.F.
0451
HOLLER, A.
0632
HOLM, I.
0439
HOLMAN, M.E.
0060
HOLMDAHL, K.H.S.
0550
HOLMES, E.J.
0594
HOLT, P.R.
0523
HOLUBITSKY, T.B.
0251
HONG, H.R.
0405
HONJO, I.
0626
HOOTKIN, L.
0726
HOPTON, D.
0054
HORECKA, J.
0684
HOUBAL, V.
0684
HOURIHANE, D.O'B.
0840*
HOUSSET, E.
0702
HOUSSET, P.
0211
HOUZE, J.-P.
0648
HOWARD, J.M.
0187
HOWARD, R.J.
0813
HOWE, R.B.
0690*
HOWOTNY, K.
0076
HRYNIEWIECKI, L.
0565
HSU, C.C.S.
0539*
HSU, K.C.
0655*
HUBEL, K.A.
0031*
HUBER, F.B.
0470
HUET, P.M.
0019*
HUGHES, E.S.R.
0532*
HUGUET, J.
0305
HUGUIER, M.
0468
HUIZENGA, K.A.
0329, 0602*
HUME, D.M.
0716*
HUMPHERYS, S.R.
0795*
HUMPHREY, L.J.
0581
HUNT, J.N.
0050*
HUNTER, A.
0025
HURWITZ, S.
0180*
HUTCHISON, J.G.P.
0891
HUTTERER, F.
0141*, 0811*

IBARGUEN BEITIA, S.
0393
IDJADI, F.
0315*
IEMMA, D.
0448
IGNATIUS, J.A.
0838*, 0860
INBERG, M.V.
0328
INGRAHAM, R.C.
0030, 0032
REY, N.S.
0704*
RGASHEV, M.K.
0100
RINO, K.
0790
RVIN, T.T.
0373*
SHAK, K.G.
0704*
SHIKAWA, T.
0790
SSA, I.
0104
ZAK, G.
0021*, 0044
ABLONSKA, M.
0021*, 0044
AECK, D.
0867
AHADI, M.R.
0252
AHNS, M.F.
0226
AKUBOWSKA, K.
0247, 0612
AMES, P.D.
0627
AMES, W.P.T.
0432*
AMPLIS, R.W.
0276
ANKOWSKA, E.
0362
ANNETTA, P.J.
0812
ANOWITZ, H.D.
0132*
ANOWSKI, B.
0362
ANSEN, F.H.
0792*
ARAMILLO, J.L.
0844
ARNUM, S.
0504, 0522
ATKAR, P.R.
0155
EANPIERRE, R.
0260, 0683
EMELKA, H.I.
0765
NKINS, S.T.H.
0257
NSEN, H.E.
0374*
SSEN, O.
0217
WELL, D.P.
0603*, 0606
WELL, W.R.
0581
JEZER, P.
0684
JHINGRAN, S.G.
0226
JIRASEK, V.
0244
JIRKO, P.
0298
JOENSSON, J.
0144*
JOERGENSEN, H.
0865
JOHANSEN, K.
0663
JOHNSON
0582
JOHNSON, A.G.
0225
JOHNSON, B.L., JR.
0177
JOHNSON, J.
0139*
JOHNSSON, T.
0228
JOHNSTON, D.
0117, 0373*
JOHNSTON, N.M.
0891
JOHNSTONE, F.R.C.
0251
JOKELAINEN, P.T.
0772*
JONES, A.L.
0006*
JONES, E.W.
0485*
JONES, F.C.
0573
JORDAN, P.
0895
JORDAN, P.H., JR.
0103
JOVER, J.
0402
JUAREZ FERNANDEZ, C.
0122
JUNG, M.
0757
KADANOV, D.
0426
KAGNOFF, M.F.
0181*
KAHN, L.B.
0849
KAJUBI, S.K.
0229
KAKANDE, M.L.
0902
KALANT, N.
0139*
KALINA, Z.
0436
KALLIOMAKI, J.L.
0379
KANIE, F.
0790
KANIGOWSKI, K.
0394
KANTER, I.E.
0538*
KAPP, F.
0624
KAPP, J.-F.
0729
KAPRAL, F.
0484*
KARASEK, F.
0673, 0746
KARWOWSKA, K.
0564
KASCHULA, O.C.
0849
KASZEWSKA-JABLONSKA, T.
0146
KATO, H.
0350
KATZ, S.
0080
KAUFMANN, P.
0777
KAUTZSCH, E.
0687
KELLY, J.M.
0073
KELLY, K.A.
0057, 0067
KEMMERER, W.T.
0796*
KENEFICK, J.S.
0446
KENNEDY, J.A.
0074
KENNEDY, T.L.
0073, 0118
KERR, J.F.
0775
KESSLER, C.A.
0091*
KESSLER, H.
0874
KETTNER, W.
0483
KEYS, T.F.
0728
KHANIN, M.N.
0100
KHRISTOV, I.
0875
KIEFFER, J.
0699
KIEFHABER, P.
0680
KIEKENS, R.
0457
KINGMA, Y.J.
0062
KINNERT, P.
0457
KIRSNER, J.B.
0569
KISSLING, M.
0774*
KLAASSEN, C.D.
0025
KLAPDOR, R.
0234
KLATSKIN, G.
0791*
KLAWE, Z.
0288
KLEBANOFF, G.
0796*
KLEIN, H.J.
0216
KLIGERMAN, M.M.
0549
KLIMOV, P.K.
0075

KLOTZ, A.P.
0133
KNECHT, E.
0506
KNOEPP, L.F., JR.
0534*
KNOWLTON, A.
0549
KNOX, M.T.
0050*
KOBAYAGAWA, K.
0413
KOCH, H.
0126, 0203, 0236
KOCH, W.
0797*
KOCIANOVA, J.
0298
KOFF, R.S.
0781*
KOLAKOWSKI, L.
0288
KOLIKOVSKI, H.G.
0425
KOMATSUBARA, K.
0790
KOMISSAROV, B.P.
0593
KONTUREK, S.
0119, 0125
KONTUREK, S.J.
0134, 0135, 0618*
KORELITZ, B.I.
0607
KORFEL, Z.
0394
KORZON, M.
0841
KOSAY, S.
0107
KOTEL'NIKOVA, V.I.
0075
KOTHE, W.
0076
KOUDAHL, G.
0419
KOURIAS, J.E.
0297
KOVACS, K.
0669
KOWALEWSKI, K.
0083*, 0088*
KOWAL-GIERCZAK, B.
0127
KOWLESSAR, O.D.
0131*
KRAEHENBUHL, J.-R.
0243
KRAFT, A.R.
0473
KRAFT, S.C.
0858
~~KRAGELUNG, E.~~
0374*
KRAMER, K.
0152
KRARUP, N.
0138*
KRAVETZ, D.
0805
KRECH, U.
0757
KRIEG, D.
0763
KRISHNASWAMI, A.K.
0904, 0905, 0906
KRIVOSHAPKIN, V.G.
0428
KROENERT, E.
0237
KROHN, K.
0312*, 0772*
KRON, B.
0649
KRONMAN
0582
KRONMAN, B.S.
0580
KROTOSKI, W.A.
0756
KUBANCOK, J.
0357
KUCHOWICZ, B.
0363
KUEHN, H.A.
0656*
KUEMMERLE, F.
0817
KUENZER, W.
0883
KUHN, G.
0789
KULIG, A.
0363
KURASZ, S.
0564
KURATSUKA, H.
0626
KURODA, K.
0321*
KUROKAWA, A.
0790
KURTZ, J.B.
0776
KUSHIDA, T.
0414
KUWERT, E.
0729
KWAKU ADADEVOH, B.
0494
KWONG, N.K.
0068
LABO, G.
0071, 0685
LABUDA, J.
0437
LAFFARGUE, P.
0214
LAFFITTE, P.
0868
LA FORCE, R.C.
0057, 0067
LAGACHE, G.
0869
LAHLOU, B.
0027
~~LAINSON, R.~~
0897
LAMAR, C., JR.
0153
LAMBERT, R.
0351, 0718*
LAMBLING, A.
0524
LAMPERT, M.
0286
LANCIAULT, G.
0110, 0120
LANDE, S.
0154
LANDING, B.H.
0653*
LANFRANCHI, G.A.
0071
LANG, J.H.
0018*
LANGDON, D.E.
0294
LAPORTE, E.
0563
LARI, J.
0265*
LAROCHELLE, J.
0799
LARRAIN, A.
0269*
LARRIEU, H.
0422
LARSEN, J.A.
0138*
LASAGNA, L.
0708
LASSER, E.C.
0018*
LATASTE, J.
0326
LATREILLE, J.-P.
0304
LAUE, R.
0528
LAUGHTER, A.H.
0103
LAUREN, P.A.
0540
LAURENT, J.
0260
LAVOIE, P.
0193
LAW& D.H.
0480, 0545
LAWOYIN, V.
0570
LAWSON, H.H.
0331
LAZUKINA, L.N.
0455
LE BEL
0582
LEBORGNE, J.
0262
LEBOVITZ, H.E.
0028
LE CAPON, J.
0583
LEE, E.C.G.
0610
LEE, R.
0669
LEEK, B.F.
0334
~~LEFFALL~~, L.D.
0596
LEGER, L.
0810
LEGRE, M.
0424
LEHY, T.
0086*
LEICHTER, J.
0497, 0502
LEMAIGRE, G.
0810

LEMMENS, P.
0657*
LE NEEL, J.C.
0262
LENNAPTZ, K.J.
0216
LENNINGER, S.
0059
LENRIOT, J.-P.
0810
LENZ, H.
0055
LEON, J.
0293
LEONARDS, J.R.
0848
LEONG, C.H.
0636
LE PARCO, J.C.
0524
LESCH, P.
0786, 0787
LESCH, R.
0678
LESZCZYNSKA, M.
0248
LETAWE, P.
0818
LEUSCHNER, U.
0016
LE VEEN, H.H.
0314*
LEVI, D.F.
0784
LEVINE, R.A.
0082*
LEVINSKY, L.
0408
LEVITT, M.D.
0491*
LEVY, CL.
0360
LEVY, G.
0848
LEWINSON, H.
0638
LEWIS, A.
0387
LEWIS, M.
0109
LEWIS, M.I.
0577
LICASTRO, R.
0508, 0509
LIE, S.
0149*
LIEBER, A.
0575
LIEBER, C.S.
0005*, 0132*, 0782*
LIETTI, A.
0371*
LIEVRE, J.A.
0527
LIFSHITZ, F.
0493*
LIFSITZ, S.
0874
LILLY, J.O.
0284
LIMA PEREIRA, F.E.
0788
LINAR, YE.YU.
0075
LINDBLAD, B.
0671
LINDENBAUM, J.
0005*
LINDREN, S.
0283
LING, C.M.
0724*
LINKE, I.
0152
LIPSHUTZ, W.
0058
LIPTON, M.J.
0198*, 0233
LISE, M.
0266*, 0336
LISIEWICZ, J.
0686
LISTER, J.
0265*
LITTLE, J.A.
0669
LLAURADO-MIRET, E.
0563
LOCALIO, S.A.
0580
LOCKHART-MUMMERY, H.E.
0542
LO GERFO, P.
0539*
LONDON, W.T.
0715*
LONG, J.A.
0006*
LONG, J.F.
0106
LONG, W.B.
0131*
LONGMIRE, W.P., JR.
0177
LONGSTRETH, G.F.
0521
LOPEZ-CALDERON BARREDA, M.
0291*
LOPEZ GALLART, M.
0342
LOPEZ GIBERT, J.
0402
LOPEZ LOPEZ, L.
0378, 0847
LOPEZ-RIOS, F.
0289
LORBOR, S.H.
0107
LORENZ, W.
0102
LOUIS, A.
0001*
LOUISY, S.
0432*
LUBCZYNSKA-KOWALSKA, W.
0127, 0323
LUCAS, R.V.
0658*
LUDWIG, J.
0803
LULU, D.J.
0123
LUNDERQUIST, A.
0550
LUNDGREN, O.
0189
LUNDH, G.
0345
LUTZ, J.
0188
MAC CALLUM, F.O.
0740, 0776
MACCHINI, M.
0115
MACIEL GOLLAN, J.R.
0356
MAC IVER, A.G.
0531*
MAC LEAN, L.D.
0166
MAC NAUGHTON, J.I.
0386
MADDEN, D.L.
0720*, 0725$
MADDREY, W.C.
0791*
MADGE, G.E.
0651*
MADSEN, C.M.
0543
MAGNENAT, P.
0760
MAGUIRE, E.J.
0008*
MAHAJAN, C.M.
0495
MAHMOUD, J.
0431*
MAINARDI, M.
0798
MAKSOUD, J.G.
0699
MALCHAIR, G.
0353
MALIAKAS, S.
0422
MALSKY, S.J.
0853
MALVAR, P.
0576
MALYUGIN, E.F.
0168
MALYUGINA, T.A.
0592
MANDIA NETO, J.
0876
MANDLE, R.J.
0517
MANITTO, P.
0692
MANSBACH, C.M., II
0085*
MARAGALL, S.
0800
MARCOZZI, G.
0208
MARCUSON, R.W.
0535*
MARCUSSEN, H.
0608
MARDOMINGO, P.
0213
MARDOMINGO VARELA, P.
0785
MARIN, W.G.
0160
MARKOVITS, S.
0278
MARKS, I.N.
0500, 0884
MARKS, J.
0512

MARMION, B.P.
0743
MARMORI, M.
0096
MARNER, I.-L.
0327
MARSAL, J.
0767
MARSH, J.B.
0142*
MARSTON, A.
0535*
MARTIN, E.
0524
MARTIN, J.D., JR.
0573
MARTINEZ, C.M.
0885
MARTINEZ, J.R.
0079
MARTINEZ-FALERO, J.
0401, 0731
MARTINEZ PRUDENCIO, P.
0393
MARTINEZ RODRIGUEZ, E.
0344, 0456
MARTINEZ ROMERO, A.
0391
MARTINEZ TELLO, F.J.
0872
MARTINEZ-VAZQUEZ, J.M.
0767
MARY, J.Y.
0019*
MASCARO, J.M.
0676
MASELLA, A.
0186
MASHILOV, V.P.
0455
MASSRY, S.G.
0170
MATEO, A.
0847
MATEO MARTINEZ, A.
0378
MATHUR, M.M.
0014
MATIJASIC, I.
0302
MATSUMOTO, Y.
0626
MATSUYAMA, T.
0321*
MATTHEW, E.B.
0720*, 0725*
MATUCHANSKY, C.
0019*
MATUSZAK, J.
0673, 0746
MAU, H.M.
0668
MAURER, C.
0832
MAURER, H.M.
0688*
MAWDSLEY, C.
0732
MAWUPE VOVOR, V.
0464
MAYCOCK, W.D'A.
0739
MAYDAT, J.
0353
MAYER, J.
0364
MAYUMI, M.
0764
MAZZONI, G.
0167
MC CAFFERY, T.D.
0284
MC CANDLESS, A.E.
0882
MC CONNELL, R.B.
0856
MC DONALD, G.S.A.
0840*
MC FARLAND, J.B.
0385
MC FARLANE, H.
0520
MC GILL, D.B.
0795*
MC GINN, T.
0770*
MC GIVEN, A.R.
0532*
MC GUIGAN, J.E.
0004*, 0320*
MC KEE, W.M.
0281
MC LEAN, R.H.
0658*
MC NAIR, A.
0504, 0522
MC NICHOLL, B.
0492*, 0519
MC PEAK, C.
0719*
MEEKER, W.R.
0581
MEEROFF, J.C.
0121, 0356
MEEROFF, M.
0241, 0356
MEHLMAN, M.A.
0147
MEHTA, S.
0880
MEINECKE, R.
0757
MELIS, M.
0167
MELKI, G.
0250
MEL'NIKOV, D.N.
0631
MENACHE, D.
0816
MERKOW, L.P.
0164
MERRITT, A.
0110
MERTZ, D.P.
0101
MESSERSCHMIDT, I.
0357
MESSINA, A.M.
0143*
MEYER, CH.
0451
MEYER-BURG, J.
0239
MICHEL, H.
0761
MICKELSEN, O.
0184
MIEDERER, S.E.
0219
MIGLIO, F.
0685
MIGLIOLI, M.
0071
MIGUEL VELASCO, J.
0289
MIKAT, E.M.
0028
MIKELADZE, K.D.
0645
MILLAR, G.
0098
MILLFR, E.C.
0085*
MILLER, G.
0354
MILLER, W.V.
0231
MILLWARD-SADLER, G.H.
0710
MILNE, G.R.
0727
MINO, F.G.
0785
MINO, G.
0213
MIRADA, A.
0643
MIRAVET, L.
0026*, 0527
MITAL, H.S.
0511
MITCHELL, B.E.
0519
MITCHINSON, M.J.
0854
MITJAVILA, M.T.
0182*
MITRA, D.K.
0466
MITTERMAYER, C.
0883
MIYAR GONZALFS, A.
0559, 0822, 0845
MIYAZAKI, T.
0078
MIZUTANI, T.
0790
MOBERG, S.
0345
MOCZURAD, K.
0395
MODIGLIANI, R.
0525
MOLLER, J.H.
0658*
MOLNAR, G.
0633
MONFORT ALBELDA, R.
0099
MONGES, H.
0066, 0214
MONTO, G.L.
0280
MONTORI, A.
0207, 0208, 0258, 0259,
MOORE, R.B.
0443
MOOSSA, A.R.
0640
MORAFS FILHO, J.P.P.
0843

MORA LARA, R.J.
0807
MORALES, O.
0346
MORANO, J.
0293
MOREAUS, J.
0679
MORENO RODRIGUEZ, L.
0609
MORGANROTH, J.
0498
MORGANTE, P.E.
0805
MORIYAMA, M.
0161
MOROSINI, S.
0450
MORRISSEY, D.M.
0382
MORRISSEY, J.F.
0409
MORSELLI, V.
0201
MORSON, B.C.
0546, 0604
MORTIER, F.
0303
MOSCARINI, M.
0258, 0259, 0842
MOSELLA, G.
0166
MOSLEN, M.T.
0163
MOSZCZYNSKI, P.
0686
MOTT, C.
0129*
MOTT, C.B.
0635*
MOUCHILI, D.
0464
MOUSSEAU, M.
0262
MOUSSOUROS, A.
0723*
MUELLER, J.C.
0006*
MUELLER, R.
0219
MUIRURI, K.L.
0751
MULLEN, J.L.
0120
MULLIS, W.F.
0837*
MUNIZ GONZALEZ, J.
0398
MURAD, T.
0484*
MURDOCK, A.L.
0133
MURO, J.
0213
MURO GONZALEZ, J.
0785
MURPHY, E.L.
0179*
MURPHY, G.M.
0792*
MUSSCHE, M.
0609
MUTINGA, M.J.
0903
MUTT, G.J.
0302
MYERS, R.M.
0878
NACCARATO, R.
0793*
NACCHIERO, M.
0637
NACHLAS, M.M.
0861
NADLER, H.L.
0143*
NAGAMACHI, Y.
0105
NAGLER, B.
0720*, 0725*
NAIK, N.T.
0015
NAIRN, R.C.
0532*
NAKANO, J.
0190*
NAREBSKI, J.
0612
NATH, K.
0511
NAVEIRA, C.
0346
NEBEN, O.T.
0049*
NEGUS, D.
0641
NEISS, A.
0832
NELSON, J.
0314*
NEVES, D.P.
0843
NEWCOMER, A.D.
0521
NEYRON DE ST. JULIEN, CH.
0530
NGOKA, J.M.
0903
NICHOLS, R.L.
0183*
NICOLIS, F.B.
0798
NICULESCU-ZINCA, D.
0246
NIEDOBITEK, F.
0789
NIEDZLELSKA, H.
0673
NIELSEN, K.
0217
NIELSEN, K.R.
0222
NILEHN, J.-E.
0670
NILSSON, S.
0144*
NIND, A.P.P.
0532*
NISEVICH, N.I.
0742
NISHIKAWA, M.
0321*
NISHIOKA, K.
0764
NOGUEIRA, J.R.
0442
NOGUERA, R.B.
0885
NOGUES, E.
0339
NOIR, B.
0080
NOLAN, J.P.
0037*
NOLTE, J.
0680
NOOTENS, J.
0482
NORBACK, D.H.
0097
NOTHMANN, B.J.
0253
NOUZHA, E.
0286
NOVI, A.M.
0081
NOVIS, B.H.
0500
NOWAR, S.
0363
NYSSEN, M.
0249
OBRADOR, D.M.
0290
OBRADORS, M.S.
0885
O'BRIEN, T.K.
0349
OBTULOWICZ, W.
0135
OCHSNER, A.
0409
O'DONNELL, J.C.
0509
ODOULAMI, H.
0464
OHBAYASHI, A.
0802
OHLSSON, E.G.
0169
OKABE, S.
0369*
OKEN, M.M.
0726
OKOCHI, K.
0764
OKUBADEJO, M.
0520
OLATUNBOSUN, D.A.
0494
OLENCHUK, A.
0808
OLIAI, A.
0781*
OLIVECRONA, H.
0550
OLIVIER, C.
0526
OLSEN, W.A.
0513
OMDAHL, J.L.
0039*
O'NEILL, A.
0689*
ONG, G.B.
0636
ONG, Y.W.
0764
ORAM-SMITH, J.C.
0837*
ORECCHIA, C.
0383

ORRILO, L.
0504, 0522
ORTIZ, E.B.
0290
ORTIZ, F.E.
0819
ORTIZ, J.P.
0506
ORTIZ VAZQUEZ, J.
0213, 0785
OSSOLA, A.
0887
OSTROVERKHOV, G.YE.
0168
OTERO SENDRA, A.
0562
OTTENI, R.
0451
OTTO, H.F.
0434*
OVERBY, L.R.
0724*
PABLICA, P.
0201
PAINTER, N.S.
0533*, 0567
PAK, C.Y.C.
0313*
PAKTORIS, YE.A.
0741
PALMER, E.D.
0404, 0412, 0864
PALMER, F.J.
0206
PANGAN, J., JR.
0467
PAOLAGGI, J.
0527
PAOLAGGI, J.A.
0211, 0415
PAOLUCCI, R.
0452
PARAK, S.
0684
PARDO, M.
0164
PARDO-GILBERT, A.
0617
PARENT, J.
0416
PARKER, A.M.
0751
PARKS, T.C.
0605
PARRILLA PARICIO, P.
0400
PARULEKAR, S.G.
0476
PASSARO, E., JR.
0338
PASTORE, J.O.
0350
~~PATELLA,~~ F.
0384
PAULET, P.
0638
PAUSTIAN, F.F.
0280
PAVEL, I.
0766
PAVLOVA, N.S.
0075
PAWLIK, A.
0566
PAYET, M.
0585
PEARSON, K.D.
0568
PECK, O.C.
0276
PECUNIA, C.
0201
PEDERSEN, F.
0217
PEDERSEN, S.A.
0327
PEDOWITZ, W.
0314*
PEIPER, H.-J.
0622
PELAEZ REDONDO, J.
0807
PENA ANGULO, J.F.
0122, 0505
PENA YANEZ, A.
0122, 0505
PENN, I.
0655*
PEQUIGNOT, H.
0646
PERA, C.
0192
PERACCHIA, A.
0450
PEREYRA, D.H.
0553
PEREZ, A.
0899
PEREZ, J.G.
0643
PEREZ-ALVARADO, N.
0617
PEREZ CARRILLO, A.
0340
PEREZ MOTA, A.
0397
PEREZ PENA, F.
0804
PERIC-GOLIA, L.
0078
PERKASH, A.
0495
PERKINS, H.A.
0230
PERKINS, R.L.
0484*
PERRICELLI, A.
0174
PERRINO, G.
0266*, 0336
PERRY, P.M.
0546
PERTEJO, Y.
0459
PESEK, A.
0302
PETERSEN, O.H.
0079
PETERSEN, P.
0223
PETERSON, M.R.
0717*
PETITE, J.-P.
0702
PETROV, P.
0426
PETROVICI, A.
0766
PETTE, D.
0680
PFEFFERMANN, R.
0890
PFEIFFER, C.J.
0369*
PFISTER, R.C.
0830
PHILLIPS, R.W.
0029, 0440
PIAZOLO, P.
0012
PICCONE, V.
0314*
PIERA MAS-SARDA, J.
0402
PIETNIEWICZ, J.
0380
PIKKARAINEN, P.H.
0162
PINTO, D.J.
0829
PINTO, V.A.C.
0699
PINTO DE MORAES FILHO, J.
0292
PIOTROWSKI, Z.
0429
PIRANI, A.
0833
PIRK, F.
0514
PISARRI, S.
0801
PITOT, H.C.
0153
PIULACHS, X.
0563
PLANETA-MALECKA, I.
0363
PLOMTEUX, G.
0709
PLOUSSARD, J.-P.
0702
POILLEUX, F.
0422
POKROVSKIY, V.I.
0455
POLACEK, K.
0700
POLEY, J.R.
0488*
POPIELA, T.
0618*
POPOW, J.
0361
POPPE, W.
0101
POPPER, H.
0141*, 0811*
PORT, R.B.
0264*
PORTER, K.A.
0655*
POTEL, J.
0053
POTEL LESQUEREUX, J.
0623
POTET, F.
0583, 0816
POUILLAUDE, J.-M.
0530
POWELL, L.W.
0775

POWIS, S.J.A.
0382
PRAHL, P.
0325
PRANCAN, A.V.
0190*
PRANGE, I.
0148
PRAT, J.R.
0685
PRESCOTT, L.M.
0879
PRESTON, J.K.
0751
PRICE, J.J.
0382
PRINCE, A.M.
0770*, 0772*
PRINO, G.
0371*
PRIOLISI, A.
0701
PROKOPCZUK, J.
0361
PROKOPOWICZ, D.
0564, 0834
PROSS, E.
0318*, 0817
PROST, A.
0525, 0527
PRZEPIORSKI, J.
0337
PUCHALSKI, Z.
0429
PUCHELLE, J.C.
0462
PUENTE, J.L.
0053
PUENTE DOMINGUEZ, J.L.
0623
PULVERTAFT, C.N.
0373*
QUATTROMANI, F.
0347
QUEMADA SISNIEGA, J.M.
0558
QVIST, G.
0387
RACHMAN, F.
0682
RACHMILEWITZ, M.
0021*, 0044
RADECKI, T.
0125
RAGHAVAN, N.G.S.
0904, 0905
RAHAL, F.
0876
RAIA, A.A.
0285
RAICIULESCU, N.
0246
RAMBAUD, J.C.
0019*, 0527
RAMPONE, A.J.
0024*
RAMSBY, G.R.
0839*
RAO, C.K.
0904, 0905, 0906
RAO, N.S.N.
0014
RASE, M.
0818
RASSLAN, S.
0876
RAU, R.
0656*
RAULIN, J.
0682
RAUTUREAU, M.
0525
REALINI, S.
0908
REBOUL, M.
0630
REDDY, S.
0520
REE, H.J.
0163
REED, G.B.
0653*
REES, W.D.
0257
REGY, J.M.
0755
REHFELD, J.F.
0077
REHM, W.S.
0114
REID, C.B.
0853
REID, D.J.
0641
REINA, J.C.
0046
REITZIG, P.
0528
REMINGTON
0582
REMY, J.
0304
RENDALL, J.M.
0655*
RENOUX, M.
0196
RETTENMAIER, G.
0238
REYNOLDS, E.S.
0163, 0711
REYNOLDS, K.W.
0317*
REYS, B.A.
0168
RIBERA, L.
0402
RIBET, A.
0001*
RIBET, M.
0303, 0304
RICK, W.
0624
RICO IRLES, J.
0122
RINGROSE, R.E.
0501
RITCHIE, H.D.
0209
RITCHIE, W.P.
0377*
RITCHIE, W.P., JR.
0316*
ROBBINS, R.
0315*
ROBERTSON-DUNN, B.
0068
ROBOZ, J.
0141*
ROBSON, J.S.
0732
RODA, C.P.
0861
RODES, J.
0691, 0808
RODGERS, J.B.
0499
RODRIGO, M.
0340, 0459
RODRIGO GOMEZ, J.M.
0400
RODRIGUEZ CUARTERO, A.
0693, 0807
ROGACHEVA, V.S.
0301
ROGERS, A.I.
0515
ROGERS, J.V., JR.
0481
ROGERS, Q.R.
0008*
ROLAND, J.
0632
ROLAND, J.M.
0532*
ROLFS, H.E.
0205
ROMAND MONNIER, C.
0249
ROMANSKA, K.
0697
ROMER, F.K.
0644
ROSATO, E.
0110
ROSATO, E.F.
0120, 0837*
ROSENBERG, A.
0194
ROSENBERG, J.L.
0453
ROSENSWEIG, N.S.
0185
ROSENTHAL, W.S.
0770*
ROSS, P.
0850
ROSS, R.C.
0011
ROSS, S.T.
0576, 0598
ROSTAFINSKI, M.
0720*
ROSWIT, B.
0853
ROTHENBERG, S.P.
0038*
ROTTHAUWE, H.W.
0489*, 0490*, 0516
ROUAUD, J.-P.
0525
ROUILLER, CH.
0013
ROUILLER, R.
0674
ROUX, M.
0649
ROWLAND, A.J.
0737
ROY, C.C.
0040*
ROY, P.B.
0900

ROY, S.
0900
ROYER, M.
0080
ROZE, C.
0137
ROZEK, K.
0436
ROZOVA, YE.I.
0075
RUBIN, C.E.
0433*
RUBIN, E.
0005*
RUBIN, W.
0003*
RUBIO ROIG, J.
0460
RUBIO SANCHEZ, J.L.
0392
RUDICK, J.
0132*, 0811*
RUDOLPH, E.
0859
RUDOWSKI, W.
0288
RUEDI, B.
0760
RUIPEREZ POLO, S.
0289
RUIZ, C.
0022*
RULFS, D.M.
0600
RUSAKOV, V.I.
0358
RUSIECKA, A.
0697
RUSINIAK, L.
0288
RYBAK, B.J.
0005*
RYKOV, V.I.
0168
SABA, T.M.
0165
SABAS OLAVARRIA, J.A.
0393
SACHS, G.
0091*
SADIKALL, F.
0717*
SAEKI, S.
0095
SAFRANY, L.
0215
SAHBA, M.M.
0430*
SAIGAL, S.
0689*
SAITO, S.
0791*
SAKAZAKI, R.
0879
SALA, T.
0459
SALAZAR DE SOUSA, J.
0458
SALDUCCI, J.
0066
SALEM, S.N.
0855
SALESSIOTIS, N.
0254
SALSANO, F.
0801
SALSBUREY, D.
0017*
SALVADOR, R.
0402
SALVIOLI, J.E.
0335, 0341, 0808
SAMBIN, P.
0249
SAMMARO, L.
0866
SAMUEL, K.C.
0511
SANCHEZ CUESTA ALARCON, F.
0099
SANCHEZ-LLORET, J.
0293
SANDBERG, A.A.
0078
SANDSTROEM, B.
0151
SANKALE, M.
0753
SAN MARTIN, P.
0213
SANS SEGARRA, M.
0557, 0560
SANTAMARIA GARCIA, J.L.
0289
SANTIAGO CORCHADO, M.
0844
SANTOS, U.M.
0788
SANYAL, S.C.
0879
SARDESAI, H.V.
0901
SARLES, H.
0129*, 0635*
SARLES, J.-C.
0648
SARNA, S.K.
0062
SARRO PALAU, M.
0460
SARTORY, L.
0633
SASS, N.L.
0160
SATINDER, L.
0705*
SATRAN, L.
0658*
SAUNDERS, D.R.
0349, 0433*
SAVA, G.
0867
SAVILLE, P.D.
0043
SAXENA, S.
0511
SBUELZ, B.
0383
SCALETTI, G.C.
0870
SCENDES, A.
0269*
SCHADE, S.G.
0033
SCHAEFER, A.
0817
SCHAEFER, J.W.
0575
SCHAEFFER, A.
0646
SCHAFFNER, F.
0141*, 0811*
SCHAMAUN, M.
0907
SCHAPIRO, H.
0109, 0195
SCHARF, R.
0083*, 0088*
SCHEDL, H.P.
0007*
SCHERSTEN, T.
0144*
SCHEUER, P.J.
0706*
SCHINDERA, F.
0883
SCHLEGEL, J.F.
0267*
SCHLEGEL, N.
0816
SCHLEYER, M.
0012
SCHMIDT, H.
0624, 0757
SCHMIDT, M.
0696
SCHMIDT, T.
0218
SCHMITT-KOEPPLER, A.
0318*
SCHNEIDER, H.
0680
SCHNEIDER, V.
0463
SCHNEIDER, W.
0797*
SCHNITZER, N.
0892
SCHOENFIELD, L.J.
0200*, 0672, 0773*
SCHOPS, T.
0324, 0359
SCHULZ, H.-J.
0528
SCHUMACHER, K.
0797*
SCHUMAN, B.M.
0295, 0348, 0828
SCHUSTER, M.M.
0253
SCHWEITZER, I.L.
0719*
SCOTT, H.J.
0445
SCRIBA, P.C.
0680
SCULTHORPE, A.E.
0184
SCURO, L.A.
0642
SEBASTIA VILA, J.L.
0342
SECK, I.
0753
SECO, J.L.
0378, 0847
SEJDOVA, H.
0298
SEKI, A.
0761
SELIGER, G.
0475

SELLES, F.P.
0677
SELTZER, M.H.
0812
SELZER, G.
0849
SEMAN, W.B.
0538*
SENGUPTA, M.
0098
SENTERFITT, V.C.
0140*
SEPPALA, P.O.
0379
SERRANO, J.
0785
SETH, O.N.
0511
SETKA, J.
0244
SEVER, J.L.
0720*, 0725* 0728
SFARCICH, D.
0080
SHABANOV, A.N.
0645
SHAFFER, W.E.
0230
SHAH, A.D.
0900
SHAHED, A.
0230
SHAKHGIL'DYAN, I.V.
0741
SHALYGINA, N.B.
0455
SHANDS, J.W., JR.
0140*
SHANKS, R.G.
0118
SHAPIRO, H.M.
0580
SHASHATY, G.G.
0634*
SHAW, J.J.
0897
SHEA, T.E.
0830
SHEPHERD, J.K.
0199*
SHERLOCK, S.
0722*, 0730, 0749, 0771*, 0793*
SHERMAN, B.S.
0145
SHERWOOD, W.C.
0780*
SHEYKO, V.Z.
0300
SHIELDS, E.
0634*
SHIH, P.-L.
0750
SHIMA, K.
0321*
SHIMKIN, P.M.
0568
SHIMODA, S.S.
0433*
HINDO, K.
0594
HINER, M.
0487*
HMERLING, D.H.
0487*
SHOEMAN, D.
0708
SHORTER, R.G.
0602*
SHOWALTER, J.P.
0263*
SHRANGO, E.
0159
SHULMAN, N.R.
0791*
SICARD, J.-L.
0590
SIERKO, S.
0394
SIERRA GIL, E.
0561
SILBERBERG, L.
0554
SILVERMAN, A.
0769*
SILVERMAN, S.
0198*, 0233
SIMON, PH.
0649
SIMONS, M.J.
0764
SIMONSEN, E.F.
0712
SINAYKO, G.A.
0741
SINGH, S.
0014
SINGHAL, S.N.
0705*
SINHA, R.
0879
SION, A.
0536*
SIVCHEV, S.
0875
SKALA, I.
0514
SKARBEK-GALAMON, C.
0673
SKONE, J.F.
0737
SLABOWICZ, J.W.
0613
SLAUNWHITE, W.R., JR.
0078
SLAVIERO, G.
0586
SLIFKIN, M.
0164
SLOVIS, T.L.
0769*
SMALL, D.M.
0831
SMETS, P.
0084*
SMETS, P.H.
0311*
SMITH, E.B.
0881
SMITH, M.W.
0027
SMITHERS, S.R.
0896
SOER, J.R.
0587
SOLCIA, E.
0010
SOLETO SAIZ, E.
0289
SOLITARE, G.B.
0667
SOLOWAY, R.D.
0200*, 0672, 0773*
SONDERGAARD, E.
0148
SONNABEND, W.
0757
SOONG, C.S.
0488*
SOUCHARD, M.
0137
SPAGLIARDI, E.
0355
SPEARS, R.L.
0719*
SPECHT, P.C.
0063
SPECK, B.
0774*
SPENCER, R.J.
0602*
SPENCER, R.P.
0444
SPJUT
0582
SPJUT, H.J.
0579
SPLITH, G.
0076
STADELMANN, O.
0219
STAHL, W.M.
0315*
STALEY, T.E.
0485*
STALLKAMP, B.
0297
STALPORT, J.
0818
STALSBERG, H.
0279
STANCHEV, P.
0427
STANFORD, W.
0796*
STARRETT, A.L.
0695
STARZL, T.E.
0655*
STARZYK, J.
0437
STASIEWICZ, J.
0361
STASIKIEWICZ-CHMIELEWSKA, B.
0361
STEENWINKEL, C.
0457
STEGGERDA, F.R.
0441
STEIGMANN, F.
0409
STEIN, J.H.
0661
STEIN, O.
0721*
STEIN, U.
0678
STEIN, Y.
0721*
STEINBERG, V.
0004*
STEINOE, K.
0389

STENGER, R.E.
0770*
STEPIEN, M.
0337
STERN, H.
0744
STEWART, J.O.
0535*
STICH, W.
0696
STILL, W.J.
0716*
STIRLING, G.A.
0733
STOICHITA-PAPILIAN, M.
0246
STOJIE, M.
0302
STOLIA, T.
0119
STOLLE, A.
0126
STOLLER, J.L.
0251
STORER, E.H.
0839*
STOYANOVA, ZH.
0427
STRAUCH, G.O.
0474
STRAUSS, R.
0770*
STRIANI, O.A.
0506
STROMBECK, D.R.
0030, 0032
STRUTHERS, J.E., JR.
0263*
SUAREZ, J.R.E.
0111
SUAREZ GONZALEZ, H.
0393
SUCRE ALEMAN, A.J.
0888
SULIMOV, YE.P.
0358
SULIMOVA, G.I.
0358
SUMMERSKILL, W.H.J.
0672, 0773*
SUNDAR RAO, P.S.S.
0388
SUNG, J.L.
0375*, 0750
SUR, B.K.
0511
SURAINDER, Y.
0689*
SUTNICK, A.I.
0715*
SUTTON, P.
0106
SUZUKI, T.
0626
SVOBODA, D.J.
0133
SWANN, J.C.
0209
SWIERCZEK, J.
0094
SYLVEN, C.
0041*
SYMMONS, R.A.
0008*
SZABO, T.
0615
SZYMAS, J.
0565
SZYMENDERA, J.
0043
TACQUET, A.
0869
TAKAHASHI, H.
0597
TAKETA, R.M.
0018*
TAKEUCHI, T.
0441
TAMARIT, L.
0340
TAMURA, K.
0413, 0879
TAN, K.L.
0665
TANDON, R.K.
0499
TANK, E.S.
0595
TARUI, S.
0321*
TASLER, J.
0135
TATEVOSYAN, A.S.
0593
TAYLOR, P.E.
0735
TAZAKI, H.
0802
TEMPLETON, F.E.
0349
TENCONI, L.T.
0798
TEOFOLI, B.
0201
TERES, J.
0800
TESSITORE, V.
0009
THALER, M.M.
0707*
THIERREE, R.-A.
0585
THIVOLET, J.
0718*
THOM, A.F.
0699
THOMAS, E.
0197*, 0370*
THOMAS, F.B.
0017*
THOMAS, M.
0867
THOMAS, T.V.
0271
THOMASSON, B.H.
0310
THOMPSON, J.B.
0488*, 0501
THOMPSON, J.H.
0092*, 0108
THOMPSON, R.G.
0891
THONGBHOUBERSRA, T.
0101
THOR, P.
0618*
THOREN, P.
0047*
THORNTON, P.A.
0639*
THRON, PH.
0647
THROW, G.B.
0471
THUC, T.K.
0668
THYBO, E.
0543
THYS, J.P.
0638
THYS, O.
0638
TIMOSHENKO, ZH.P.
0093
TISOCRNIA, O.
0129*
TITTHASIRI, N.
0675
TIU, A.
0467
TKACZEWSKI, W.
0673, 0746
TOBIN, R.B.
0147
TOCCALINO, H.
0509
TOD, R.
0585
TOKARZ, S.
0436
TOLLOCZKO, A.
0429
TOMAS RIDOCCI, M.
0400, 0417
TOMATIS, H.P.
0112
TOMKIN, G.H.
0322*
TOMPKINS, R.K.
0662
TONKIN, R.W.
0743
TONTI, R.
0201
TOOULI, J.
0056
TORRES TORREBLANCA, F.
0827
TORSOLI, A.
0052
TOULEMONDE, H.
0873
TOULET, J.
0709
TOULOUKAIN, R.J.
0444
TRAVIESO, C.R., JR.
0534*
TREPO, C.
0718*
TREPO, CH.
0249
TREYA, I.A.
0093
TRIER, J.S.
0181*
TRIGER, D.R.
0710, 0776
TRIVEDI, P.S.
0900
TROITSKAYA, V.B.
0075

TRUCKER, P.C.
0619
TRUDEAU, W.L.
0320*
TRUELOVE, S.C.
0603*, 0606
TRULZSCH, D.
0141*, 0811*
TSEYLIKMAN, E.G.
0631
TUAN, T.V.
0182*
TUCKER, P.C.
0128*
TUNG, L.C.
0297
TURNBULL
0582
TURNBULL, R.B., JR.
0478
TUTTON, R.A.
0256
TWOMEY, J.J.
0103
TYLEN, U.
0550
UCHAYKIN, V.F.
0742
UCHIDA, K.
0626
UNDERWOOD, B.A.
0628
UPADHYAYA, P.
0466
URCA, I.
0408, 0874
URDANETA, N.
0549
URIBE, P.
0269*
USHER, R.
0689*
USTINOV, V.N.
0075
VAILLE, C.
0137
VALDIVIESO, V.D.
0020*
VALENTINI, S.B.
0287
VALENZUELA, J.
0368*
VALLI, A.
0167
VANDAM, L.D.
0711
VAN DE LOO, J.
0797*
VAN DEN BORRE, M.
0176
VAN GEERTRUYDEN, J.
0457
VAN MIERT, A.S.J.P.A.M.
0334
VAN REEFINGHEN, P.
0660
VAN SLYCK, E.J.
0828
VANSTEENKISTE, Y.
0084*, 0311*
VANTINI, I.
0642
VAN VAERENBERGH, P.
0657*
VAR, A.
0180*
VARCO, R.L.
0443
VARNELL, T.R.
0045
VASSEUR, B.
0137
VASSOYAN, J.
0647
VAYRE, M.
0649
VAZQUEZ ARNEDO, M.
0872
VEKSLER, KH.M.
0093
VERA, R.
0549
VERNE, J.
0172
VERNENGO LIMA, M.H.
0506
VEROUGSTRAETE, C.
0877
VEYRIERES, M.
0679
VICECONTE, G.
0207, 0258, 0842
VIDONE, R.
0549
VIELLE, C.
0660
VIGLIETTA, G.
0201
VIIKARI, S.J.
0328
VILA, J.
0293
VILAR BONET, J.
0846
VILLAR, O.A.
0506
VINH, T.S.
0468
VINIJCHAIKUL, K.
0130*
VISSOULIS, C.
0723*
VITEAU, J.M.
0709
VITSE, M.
0554
VOGEL, C.L.
0717*
VORONOV, A.A.
0300
VUCHELIC, M.
0768
VULCHEVA, V.
0426
VUORI, J.
0328
VYAS, G.N.
0230
VYAS, M.C.
0155
WAGENKNECHT, L.V.
0886
WAGNER, A.
0463
WAGNER, K.
0218
WALDSCHMIDT, T.J.
0297
WALIA, B.N.S.
0880
WALKER, B.
0373*
WALKER, G.
0005*
WALKER, J.G.
0771*
WALKER, W.
0882
WALL, M.J.
0023*
WALLACE, J.
0727
WALLACH, S.
0145
WALLER, S.L.
0052
WALSH, J.H.
0089*, 0231
WALTHER, J.
0076
WARA-WASOWSKA, K.
0363
WARNER, J.
0432*
WARWICK, W.J.
0658*
WASHINGTON, J.L.
0695
WASSERSTEIN, M.
0777
WASTELL, C.
0386
WATERFALL, W.
0068
WATON, N.G.
0113
WATSON, D.W.
0498
WATSON, L.E.
0231
WATT, J.
0376*
WATTS, J.MCK.
0056
WEBB, T.E.
0176
WEBER, G.
0157
WEBER, K.B.
0759
WEBSTER, P.D.
0128*, 0619
WEHMER, U.
0797*
WEIGL, E.
0763
WEILL, F.
0243
WEINBREN, K.
0733
WEIR, D.G.
0322*, 0372*
WEISBERG, H.
0038*
WEISBRODT, N.W.
0070
WEISE, H.-J.
0754
WEITZNER, S.
0545
WELSH, J.D.
0501, 0668

WENDLANDT, H.
0528
WERNER, G.
0601
WERNZE, H.
0761
WESTBROOK, P.R.
0521
WESTMORE, J.B.
0280
WHITAKER, J.C.C.
0333
WHITE, T.T.
0054
WHITEHEAD, R.
0531*
WHITEHEAD, R.G.
0862
WHITTAKER, G.E.
0068
WHITTEN, E.H.
0029, 0440
WIECKOWSKA, Z.
0308
WIENBECK, M.
0070
WILBERT, L.
0713
WILDGRUBE, H.J.
0016
WILEY, J.N.
0074
WILKINSON, A.R.
0117
WILLEMS, G.
0084*, 0311*
WILLIAMS, G.
0225
WILLIAMS, J.A.
0385
WILLIAMS, J.R.
0264*, 0268*, 0732
WILLIAMS, R.
0655*, 0748
WILSON, D.E.
0082*
WINANS, C.S.
0048*, 0264*
WING, A.
0719*
WINKLER, K.
0217
WINTERS, R.E.
0177
WIRTS, C.W.
0517
WISCH, N.
0607
WISE, L.
0307
WITYK, J.J.
0861
WOERSCHING, I.
0102
WOJAKOWSKI, T.
0396
WOJDALSKI, J.
0394
WOLF, F.
0237
WOODRUFF, A.W.
0894
WORONIECKA-MAZURKIEWICZ, A.
0566
WORTSMAN, J.
0313*
WRIGHT, J.R.
0253
WRIGHT, R.
0776, 0779
WYNKOOP, B.
0314*
YANG, M.G.
0184
YAP, E.H.
0764
YARNOZ, M.
0314*
YATVIN, M.B.
0153
YAZBEK, A.
0410
YII, J.Y.
0375*
YOUNIS, M.T.
0861
YOUNOSZAI, M.K.
0007*
ZACCHEROTTI, L.
0116
ZANELLA, E.
0452
ZANOTTI, W.M.
0788
ZAPOROZHENKO, I.G.
0124
ZARAGOZA GARCIA, P.
0821
ZATHURECZKY, G.
0633
ZAVALA, B.
0617
ZENANDREA, B.
0788
ZEOLITE, C.
0111
ZHIL'TSOVA, G.V.
0742
ZIINO, L.
0701
ZIKE, W.L.
0477
ZIMMERMANN, W.
0678
ZINSOU, R.-D.
0464
ZOLLINGER, R.M.
0409
ZUBIKOVA, I.I.
0742
ZUBIZARRETA, A.
0691
ZUCKERMAN, A.J.
0738
ZUFFA, M.
0357
ZWINGER, A.
0700

Numbers followed by an asterisk (*) refer to abstracts in the text. Other numbers refer to citations.

SUBJECT INDEX

- ABDOMEN
  - ACUTE
    - CELIAC-AXIS COMPRESSION SYNDROME 431*
    - ENTERITIS 460
  - DIAGNOSIS
    - ECHOGRAPHY 243

- ABSCESS
  - LIVER
    - DIAGNOSIS 255
    - ECHOGRAPHY 255

- ABSORPTION
  - CALCIUM
    - SMALL INTESTINE 43
    - TRACER STUDY 43
  - CIRCULATION
    - LIPIDS 41*
  - DIETARY FACTORS
    - CALCIUM 39*
  - ENDOTOXIN
    - DRUG EFFECTS ON 37*
  - ENTEROCOLITIS
    - CHRONIC 435*
  - ESCHERICHIA COLI
    - CECUM 184
  - FATTY ACIDS
    - BILE 24*
    - BILE ACIDS 24*
    - SMALL INTESTINE 24*
  - FOLIC ACID
    - DEFICIENCY 44
    - LARGE INTESTINE 44
    - SMALL INTESTINE 44
  - GASTROINTESTINAL
    - AGE FACTORS 46
  - HYPOTHERMIA
    - LIPIDS 41*
  - INTESTINE
    - BILIRUBIN 80
  - INTRINSIC FACTOR
    - SMALL INTESTINE 38*
    - VITAMIN B12 38*
  - IRON
    - AGE FACTORS 46
    - DRUG EFFECTS ON 17*
    - SMALL INTESTINE 17*, 33
  - LACTOSE
    - LACTOSE INTOLERANCE 505
  - LEAD
    - AGE FACTORS 46
  - PANCREAS
    - ATROPHY 20*
  - PROTEIN
    - BACTERIA 485*
    - NEONATE 485*
    - STARVATION 485*
  - SMALL INTESTINE
    - ACIDITY 22*
    - CALCIUM 39*, 180*
    - CONTRAST MEDIA 18*
    - FOLIC ACID 21*
    - LIPIDS 41*
    - VITAMIN D 180*
  - SPECIES DIFFERENCES
    - DRUGS 25
  - STOMACH
    - DRUGS 42
  - STRONTIUM
    - AGE FACTORS 46
  - SUGAR
    - DRUG EFFECTS ON 36
    - LARGE INTESTINE 36
  - XYLOSE
    - CELIAC DISEASE 506, 508
    - DIAGNOSIS 508
    - GIARDIASIS 508
    - MALNUTRITION 508

- ACCIDENT
  - BIOPSY
    - DUODENUM 442

- ACETIC ACID
  - ACID SECRETION
    - CORTICOSTEROIDS 87*

- ACETYLCHOLINE
  - SALIVARY GLAND
    - SECRETION 79

- ACHALASIA
  - DIAGNOSIS
    - PRESSURE STUDIES 199*
  - ESOPHAGUS
    - DILATATION 294
    - MOTILITY 280
  - ETIOLOGY 266*
  - PRESSURE STUDIES 275*
  - SURGERY 274, 282*
  - THERAPY 274

- ACHLORHYDRIA
  - SEE ALSO ACID SECRETION
  - DISEASES ASSOCIATED WITH
    - SJOGRENS SYNDROME 292

- ACID PHOSPHATASE
  - SEE PHOSPHATASE, ACID

- ACID SECRETION
  - SEE ALSO ACHLORHYDRIA
  - SEE ALSO HYPERCHLORHYDRIA
  - SEE ALSO HYPOCHLORHYDRIA
  - ACETIC ACID
    - CORTICOSTEROIDS 87*
  - ATROPINE
    - IMMUNOSUPPRESSION 92*
  - CHOLINERGIC AGENTS
    - STOMACH 83*
  - DYSPEPSIA
    - DIAGNOSIS 229
  - FEEDING
    - HEIDENHAIN POUCH 89*
  - FISTULA
    - STOMACH 92*
  - GASTRIN
    - HEIDENHAIN POUCH 89*
  - HISTAMINE
    - ADRENERGIC BLOCKING AGENTS 104
    - IMMUNOSUPPRESSION 92*
  - INHIBITION
    - ALCOHOL 107
  - PENTAGASTRIN
    - IMMUNOSUPPRESSION 92*
  - PEPTIC ULCER
    - CONSTITUTIONAL FACTORS 417
    - DIAGNOSIS 225, 229
    - DRUG EFFECTS ON 397
    - DRUG TREATMENT 395
    - ETIOLOGY 316*
    - SURGERY 368*, 374*, 423
  - PROSTAGLANDIN
    - STOMACH 82*
  - STOMACH 114, 229
    - ADRENERGIC BLOCKING AGENTS 104
    - ALCOHOL 107

    - ATROPINE 86*
    - CALCIUM 338
    - CARBONIC ANHYDRASE INHIBITORS 101
    - CHOLINERGIC AGENTS 88*
    - CORTICOSTEROIDS 87*
    - DIAGNOSIS 232, 251
    - DIURETICS 101
    - DRUG EFFECTS ON 395
    - GASTRIN 110
    - HORMONE 88*
    - HORMONE CONTROL 404
    - MUCOSA 119
    - PSORIASIS 367
    - ULCER 400
  - VAGOTOMY
    - HEIDENHAIN POUCH 89*

- ACIDITY
  - ASCITES
    - CIRRHOSIS 809
  - INTRINSIC FACTOR
    - BINDING 85*
  - SMALL INTESTINE
    - ABSORPTION 22*
    - ION TRANSPORT 22*

- ACIDS
  - STOMACH
    - MOTILITY 50*

- ADAPTATION
  - ENTERECTOMY 869

- ADENYLATE CYCLASE
  - LIVER
    - ENZYME 154
    - METABOLISM 154

- ADHESIONS
  - INTESTINE
    - SURGERY 471

- ADHESIVES
  - SEE TISSUE ADHESIVES

- ADOLESCENTS
  - CHOLECYSTITIS 812

- ADRENAL
  - PEPTIC ULCER
    - SURGERY 323

- ADRENERGIC BLOCKING AGENTS
  - ACID SECRETION
    - HISTAMINE 104
    - STOMACH 104

- AFFERENT LOOP SYNDROME
  - AMINO ACID
    - METABOLISM 322*

- AGE FACTORS
  - SEE ALSO CHILDREN, NEONATE
  - CELIAC DISEASE
    - CONSTIPATION 492*
  - GASTROINTESTINAL
    - ABSORPTION 46
    - DIVERTICULUM 845
    - NEOPLASMS, MALIGNANT 872
  - IRON
    - ABSORPTION 46
  - LEAD
    - ABSORPTION 46
  - LIVER
    - ENZYMES 143*
  - SECRETION
    - INTRINSIC FACTOR 103
  - STRONTIUM
    - ABSORPTION 46

- ALBUMIN
  - BILIRUBIN
    - BINDING 694
  - HYPERBILIRUBINEMIA
    - SERUM 701

- ALCOHOL
  - ACID SECRETION
    - INHIBITION 107
    - STOMACH 107
  - FATTY LIVER
    - METABOLISM 162
  - INTERACTION
    - BILIRUBIN 692
    - JAUNDICE 692
  - INTESTINE
    - CELLS 182*
  - LIVER FUNCTION
    - HYPOTHERMIA 138*
  - METABOLISM
    - DRUG EFFECTS ON 782*
  - PANCREAS
    - SECRETION 129*, 132*
  - SMALL INTESTINE
    - ULTRASTRUCTURE 5*
  - STOMACH
    - MUCOSA 311*

- ALCOHOLIC LIVER DISEASE
  - SEE LIVER DISEASE, ALCOHOLIC

- ALKALINE PHOSPHATASE
  - SEE PHOSPHATASE, ALKALINE

- ALLERGY
  - CELIAC DISEASE
    - DIETARY FACTORS 486*, 487*, 49
  - MENTRIERS DISEASE
    - ETIOLOGY 363

- AMEBIASIS
  - COMPLICATIONS 890
  - DIAGNOSIS
    - IMMUNOLOGY 858
    - TECHNIQUES 905
  - DRUG TREATMENT 892, 899, 901
  - EPIDEMIOLOGY 904
  - GIARDIASIS 899
  - ULCERATIVE COLITIS
    - DIAGNOSIS 617

- AMINES
  - NUCLEIC ACIDS
    - SYNTHESIS 98
  - PROTEIN
    - SYNTHESIS 98

- AMINO ACID
  - INTESTINE
    - TRANSPORT 35
  - LIVER
    - SYNTHESIS 160
  - METABOLISM
    - AFFERENT LOOP SYNDROME 322*
    - DISEASES 671
    - LIVER DISEASES 671, 685

- AMINO ACIDS
    - LIVER 45
    - TRANSPORT
        - DIETARY FACTORS 45
        - VITAMIN A 45
- AMYLASE
    - PANCREAS
        - ANTIBIOTICS 128*
    - SERUM
        - ANALYSIS 131*
        - PANCREATITIS 634*
- ANALGESICS
    - ESOPHAGITIS
        - DRUG TREATMENT 360
    - GASTRITIS
        - DRUG TREATMENT 360
    - PEPTIC ULCER
        - DRUG TREATMENT 360
- ANALYSIS
    - ANTIGEN, AUSTRALIA 735
    - BILE ACIDS 815
    - PLASMA
        - ANTIGEN, AUSTRALIA 752
    - SERUM
        - AMYLASE 131*
- ANEMIA
    - PARASITES AND PARASITIC DISEASE
        - DISEASES ASSOCIATED WITH 894
    - PEPTIC ULCER
        - SURGERY 380
- ANEMIA, PERNICIOUS
    - IMMUNOLOGY 312*
- NESTHESIA
    - SECRETION
        - STOMACH 91*
- NESTHETICS
    - DRUG
        - INTERACTIONS 711
    - HEPATITIS, NONVIRAL
        - DRUG-INDUCED 710, 711, 713
- NGIOGRAPHY
    - BILIARY TRACT
        - DIAGNOSIS 200*, 260
        - TECHNIQUES 200*
    - CHOLELITHIASIS 827
    - COMPLICATIONS
        - LARGE INTESTINE 550
    - DUODENUM
        - ARTERY 568
    - JAUNDICE
        - DIAGNOSIS 256
    - LIVER
        - DIAGNOSIS 262
        - ECHINOCOCCOSIS 213
    - PANCREAS
        - NEOPLASMS 235
        - TRAUMA 629
    - PEPTIC ULCER
        - DIAGNOSIS 405
- NGIOTENSIN
    - HEPATITIS, VIRAL 761
- NILINE
    - LIVER
        - METABOLISM 178
- ANKYLOSTOMIASIS
    - MALABSORPTION
        - ETIOLOGY 511
- ANOMALY
    - ANUS
        - MUCOSA 594
    - COLON
        - SURGERY 461
    - CONGENITAL
        - BILIRUBIN 693
        - GALLBLADDER 825
        - LARGE INTESTINE 548
    - DISEASES ASSOCIATED WITH 496
    - ETIOLOGY
        - PEPTIC ULCER 425
    - ILEUM
        - SURGERY 461
    - METABOLISM
        - BILIRUBIN 693
    - PANCREAS
        - DISEASES ASSOCIATED WITH 346
    - PANCREATIC DUCT
        - PANCREATITIS 649
- ANOMALY, CONGENITAL
    - ANUS
        - DIAGNOSIS 595
    - DUODENUM 477
    - ESOPHAGUS
        - FISTULAS 300
    - RECTUM
        - DIAGNOSIS 595
- ANORECTUM
    - SPHINCTER
        - STIMULATION 591
- ANOREXIA
    - CELIAC DISEASE
        - DIAGNOSIS 526
- ANOREXIGENIC AGENTS
    - BILE
        - SECRETION 142*
    - METABOLISM
        - TRIGLYCERIDE 142*
- ANTIBIOTICS
    - BILE
        - COMPOSITION 177
        - SECRETION 177
    - ESOPHAGITIS
        - DRUG-INDUCED 281
    - HEPATITIS, NONVIRAL
        - DRUG-INDUCED 705*, 709
    - LIVER
        - INJURY 708
    - PANCREAS
        - AMYLASE 128*
        - SECRETION 128*
    - PERITONITIS
        - DRUG TREATMENT 881
- ANTIBODIES
    - CIRRHOSIS
        - GENETICS 793*
    - HEPATITIS, CHRONIC
        - GENETICS 771*
    - MITOCHONDRIA
        - HEPATITIS, CHRONIC 778
    - ULCERATIVE COLITIS 602*
        - LIVER 608
    - VIRUS
        - HEPATITIS, CHRONIC 776

- ANTICHOLINERGIC AGENTS
  - ESOPHAGUS
    - DIAGNOSIS 268*
  - GASTROINTESTINAL
    - DRUG TREATMENT 851, 852

- ANTICOAGULANTS
  - HEMATOMA
    - DRUG-INDUCED 451, 468

- ANTIENZYMES
  - PANCREATITIS
    - DRUG TREATMENT 645

- ANTIEPILEPTICS
  - HEPATITIS, NONVIRAL
    - DRUG-INDUCED 712

- ANTIGEN, AUSTRALIA
  - ANALYSIS 735
    - PLASMA 752
  - CIRRHOSIS 800
    - BILIARY 791*
    - EPIDEMIOLOGY 717*, 753
  - DIAGNOSIS 757
  - DOWNS SYNDROME
    - HEPATITIS, VIRAL 715*
  - ETHNIC FACTORS 751, 764
  - HEPATITIS, CHRONIC
    - ELECTRON MICROSCOPY 779
  - HEPATITIS, SERUM
    - ETIOLOGY 729
  - HEPATITIS, VIRAL 718*, 747, 750, 758, 762, 765, 767
    - DOWNS SYNDROME 720*
    - EPIDEMIOLOGY 720*, 756
    - HEMODIALYSIS 759
    - IMMUNOLOGY 724*, 725*
    - NEONATE 719*
  - LIVER
    - BIOPSY 715*
    - CELLS 717*, 721*, 723*
  - NEOPLASMS, MALIGNANT
    - EPIDEMIOLOGY 753
    - LIVER 753

- ANTIINFLAMMATORY AGENTS
  - GASTROINTESTINAL
    - BLEEDING 410, 411
  - STOMACH
    - BLOOD FLOW 115
    - MUCOSA 319*, 348

- ANTIMETABOLITES
  - HEPATITIS, NONVIRAL
    - DRUG-INDUCED 706*

- ANTISECRETORY AGENTS
  - PEPTIC ULCER
    - DRUG TREATMENT 375*

- ANTISPASMODICS
  - GASTROINTESTINAL
    - SURGERY 873

- ANTRECTOMY
  - SEE ALSO GASTRECTOMY
  - SEE ALSO STOMACH, SURGERY
  - SURGERY
    - TECHNIQUES 365

- ANTRUM
  - SEE ALSO STOMACH
  - HORMONE CONTROL
    - HORMONE CONTROL 58
  - ULTRASTRUCTURE
    - GASTRIN 4*

- ANUS
  - SEE ALSO LARGE INTESTINE
  - ANOMALY, CONGENITAL
    - DIAGNOSIS 595
  - MUCOSA
    - ANOMALY 594
  - NEOPLASMS, MALIGNANT
    - SURGERY 552
  - PRESSURE STUDIES 48*

- APPENDECTOMY
  - INTESTINE
    - FISTULA 592

- APPENDICITIS
  - ACUTE 553, 566
    - RADIOGRAPHY 600
    - REVIEWS 573
    - SURVIVAL 593
  - COMPLICATIONS
    - PREGNANCY 554

- APPENDIX
  - SEE ALSO LARGE INTESTINE
  - CARCINOIDS 540
  - DIVERTICULUM 588
  - STRANGULATION
    - HERNIA 561

- APPETITE
  - NERVOUS CONTROL 191
  - SECRETION
    - NERVOUS CONTROL 105

- ARTERY
  - DUODENUM
    - ANGIOGRAPHY 568

- ASCITES
  - ACIDITY
    - CIRRHOSIS 809

- ASPIRIN
  - GASTROTINTESTINAL
    - BLEEDING 848
  - INTESTINE
    - MUCOSA 441
    - VILLI 441

- ATRESIA
  - ESOPHAGUS
    - DILATATION 310
    - THERAPY 310

- ATROPHY
  - PANCREAS
    - ABSORPTION 20*
    - TRIGLYCERIDE 20*

- ATROPINE
  - ACID SECRETION
    - IMMUNOSUPPRESSION 92*
    - STOMACH 86*
  - MUCOSA
    - STOMACH 86*

- AUTORADIOGRAPHY
  - STOMACH
    - DIAGNOSIS 216

- BACTERIA
  - CARBOHYDRATE
    - INTOLERANCE 493*
  - DIARRHEA
    - CHILDREN 878
    - IMMUNOLOGY 879
  - GASTROINTESTINAL
    - INFLAMMATION 866
  - HEPATITIS, NONVIRAL
    - BIOPSY 714
  - INFECTION
    - KWASHIORKOR 520
  - LARGE INTESTINE 183*
  - PROTEIN
    - ABSORPTION 485*
  - SMALL INTESTINE
    - DIVERTICULUM 437
  - WHIPPLES DISEASE
    - ETIOLOGY 484*

- BARIUM
  - RECTUM
    - GRANULOMA 545

- BEZOARS
  - SEE FOREIGN BODIES

- BICARBONATE
  - PANCREAS
    - SECRETION 129*

- BILE
  - ABSORPTION
    - FATTY ACIDS 24*
  - CHEMICAL COMPOSITION
    - BILE ACIDS 832
  - COMPOSITION
    - ANTIBIOTICS 177
  - DISEASE
    - THYROID 94
  - ENZYMES
    - THYROID 94
  - PANCREATIC DUCT
    - MOTILITY 59
  - SECRETION
    - ANOREXIGENIC AGENTS 142*
    - ANTIBIOTICS 177
    - CONTRAST MEDIA 830
    - DRUGS 25
    - STOMACH 106
    - THYROID 94
  - STEROID
    - EXCRETION 78

- BILE ACIDS
  - ABSORPTION
    - FATTY ACIDS 24*
  - ANALYSIS 815
  - BILE
    - CHEMICAL COMPOSITION 832
  - BILIARY TRACT
    - COMPOSITION 141*
    - OBSTRUCTION 141*, 811*
  - CHOLELITHIASIS
    - DRUG TREATMENT 835
    - ETIOLOGY 815
  - COMPOSITION
    - PREGNANCY 139*
  - LIPID
    - MALABSORPTION 523
  - LIVER 811*
  - LIVER DISEASE
    - CHOLESTASIS 792*
    - COMPOSITION 792*
  - METABOLISM
    - REVIEWS 523
  - SMALL INTESTINE
    - ION TRANSPORT 23*
  - STOMACH
    - NERVOUS CONTROL 72

- BILE DUCT
  - NEOPLASMS, BENIGN 817
  - STRICTURE 814

- BILE SALTS
  - SEE BILE ACIDS

- BILE TRACT
  - DISEASE 824
  - SURGERY 824

- BILIARY
  - SECRETION
    - GASTRIN 137
    - PENTAGASTRIN 137

- BILIARY TRACT
  - ANGIOGRAPHY
    - TECHNIQUES 200*
  - COMPOSITION
    - BILE ACIDS 141*
  - DIAGNOSIS
    - ANGIOGRAPHY 200*, 260
    - RADIOLOGY 203, 215
  - DISEASE 821
  - MOTILITY
    - CHOLECYSTOKININ 56
    - GASTRIN 56
    - HORMONE CONTROL 56
    - PENTAGASTRIN 75
    - SECRETIN 56
  - NERVOUS CONTROL 54
  - OBSTRUCTION
    - BILE ACIDS 141*, 811*
    - CIRCULATION 169
    - ELECTROLYTE 170
    - INFECTION, BACTERIA 818
    - SEQUELAE 818
  - PRESSURE STUDIES 54
    - DIAGNOSIS 53
  - SECRETION 54
    - DIAGNOSIS 53
  - SURGERY
    - COMPLICATIONS 836
    - NERVOUS SYSTEM 660
    - TECHNIQUE 819
  - TRAUMA
    - SURGERY 836

- BILIRUBIN
  - ABSORPTION
    - INTESTINE 80
  - ALCOHOL
    - INTERACTION 692
  - ANOMALY
    - CONGENITAL 693
    - METABOLISM 693
  - BINDING
    - ALBUMIN 694
    - ERYTHROCYTE 694
    - IN VITRO 694
  - COMPOSITION
    - CIRRHOSIS 807
  - HEPATITIS, VIRAL 731
  - METABOLISM
    - LIVER 696
  - PLATELETS 688*

  SYNTHESIS
    ERYTHROCYTES 690*

BINDING
  INTRINSIC FACTOR
    ACIDITY 85*

BIOCHEMISTRY
  LIVER DISEASE, ALCOHOLIC
    DIAGNOSIS 785

BIOPSY
  ACCIDENT
    DUODENUM 442
  CIRRHOSIS
    DIAGNOSIS 672
  ESOPHAGUS
    DIAGNOSIS 197*
  GASTRITIS
    DIAGNOSIS 352
  GASTROINTESTINAL
    DIAGNOSIS 208
  HEPATITIS
    DIAGNOSIS 223
  HEPATITIS, CHRONIC
    DIAGNOSIS 672
  HEPATITIS, NONVIRAL
    BACTERIA 714
  HODGKINS DISEASE
    LIVER 198*
  JAUNDICE, OBSTRUCTIVE
    DIAGNOSIS 209
  LIVER
    ANTIGEN, AUSTRALIA 715*
  LIVER DISEASE, ALCOHOLIC 788
    FATTY LIVER 789
  PANCREAS
    DIAGNOSIS 239
  SMALL INTESTINE
    DIAGNOSIS 214, 242
  STOMACH
    DIAGNOSIS 216

BLEEDING
  COLON
    DIVERTICULUM 538*
  ESOPHAGUS
    SURGERY 297
  GASTRITIS
    COMPLICATIONS 317*
  GASTROINTESTINAL
    ANTIINFLAMMATORY AGENTS 410, 411
    DIAGNOSIS 270
    ENDOSCOPY 842
    ETIOLOGY 288
    GASTRITIS 355
    STRESS 315*
    SURGERY 317*
    TREATMENT 748
    VASOCONSTRICTORS 839*
  GASTROTINTESTINAL
    ASPIRIN 848
  HERNIA, HIATUS
    COMPLICATIONS 288
  INTESTINE
    TYPHOID 467
  PANCREATITIS
    TREATMENT 641
  STOMACH
    DRUG TREATMENT 314*
    ENDOSCOPY 240
    VASOCONSTRICTORS 314*

BLIND LOOP SYNDROME
  MALABSORPTION
    VITAMIN D 525

BLOOD FLOW
  STOMACH
    ANTIINFLAMMATORY AGENTS 115
    ENDOSCOPY 115

BROMSULPHALEIN
  METABOLISM
    DUBIN-JOHNSON SYNDROME 691
    JAUNDICE 691

CAFFEINE
  STOMACH
    MUCOSA 319*

CALCIUM
  ABSORPTION
    SMALL INTESTINE 43
    TRACER STUDY 43
  DIETARY FACTORS
    ABSORPTION 39*
  INTESTINE
    TRANSPORT 34
  LIVER
    ION TRANSPORT 145
  MALABSORPTION 313*
  SALIVARY GLAND
    SECRETION 79
  SMALL INTESTINE
    ABSORPTION 39*, 180*
    METABOLISM 12
  STOMACH
    ACID SECRETION 338
  TRANSPORT
    SMALL INTESTINE 26*
    VITAMIN D 26*
  VITAMIN D
    TRANSPORT 34

CALCULI
  PANCREATITIS
    ETIOLOGY 639

CANCER
  SEE NEOPLASMS, MALIGNANT

CARBOHYDRATE
  FECES
    DIARRHEA 509
  INTOLERANCE
    BACTERIA 493*
    CHILDREN 493*
    DIARRHEA 493*
  MALABSORPTION
    REVIEWS 513
  METABOLISM
    CARBON TETRACHLORIDE 99
    CIRRHOSIS 684
    HEPATITIS, VIRAL 684
    LIVER 152

CARBON TETRACHLORIDE
  LIVER
    INJURY 161, 163
  METABOLISM
    CARBOHYDRATE 99
    COENZYMES 99

CARBONIC ANHYDRASE INHIBITORS
  ACID SECRETION
    STOMACH 101

CARCINOGENESIS
  LIVER
    ETHIONINE 164

CARCINOIDS
    APPENDIX 540
    STOMACH 325

CATECHOLAMINES
    GASTRIN
        SECRETION 118

CATHARTICS
    SEE LAXATIVES

CECUM
    SEE ALSO LARGE INTESTINE
    ESCHERICHIA COLI
        ABSORPTION 184

CELIAC-AXIS COMPRESSION SYNDROME
    ABDOMEN
        ACUTE 431*

CELIAC DISEASE
    ALLERGY
        DIETARY FACTORS 486*, 487*, 498
    CONSTIPATION
        AGE FACTORS 492*
        CHILDREN 519
    DIAGNOSIS
        ANOREXIA 526
        DISEASES ASSOCIATED WITH 527
        TECHNIQUES 506
    DISEASES ASSOCIATED WITH 495
    REVIEWS 530
        DIAGNOSIS 518
        TREATMENT 518
    VILLI
        ULTRASTRUCTURE 487*
    XYLOSE
        ABSORPTION 506, 508

CELLS
    DYSFUNCTION
        STEATORRHEA 433*
    HEIDENHAIN POUCH
        FEEDING 84*
    HEPATITIS, VIRUS
        MORPHOLOGY 733
    INTESTINE
        ALCOHOL 182*
    LIVER
        ANTIGEN, AUSTRALIA 717*, 721*,
          723*
        VIRUS 721*

CHEMICAL COMPOSITION
    BILE
        BILE ACIDS 832
    LIVER
        VITAMIN B12 687
    STOMACH
        SECRETION 121

HEMOTAXIS
    LIVER DISEASE, ALCOHOLIC
        CIRRHOSIS 783*

HEMOTHERAPY
    GASTROINTESTINAL
        NEOPLASMS, MALIGNANT 888
    NEOPLASMS, MALIGNANT
        COLON 582

HILDREN
    SEE ALSO NEONATE, AGE FACTORS
    CARBOHYDRATE
        INTOLERANCE 493*
    CHOLELITHIASIS 833
    CONSTIPATION
        CELIAC DISEASE 519
    DIARRHEA
        BACTERIA 878
        ETIOLOGY 880
    GALLBLADDER
        VOLVULUS 829
    JEJUNUM
        MUCOSA 432*
    LACTOSE INTOLERANCE
        DIARRHEA 509
    LIVER
        HEMANGIOMATOSIS 658*
        NEOPLASMS, BENIGN 666
        NEOPLASMS, MALIGNANT 666
    LIVER DISEASES 653*
    MENTRIERS DISEASE
        DIAGNOSIS 363
    PANCREATITIS
        ETIOLOGY 640

CHLORINATED TRIPHENYL
    LIVER
        ENDOPLASMIC RETICULUM 97

CHOLANGIOGRAPHY
    SEE ANGIOGRAPHY

CHOLANGITIS
    PANCREATITIS
        DISEASES ASSOCIATED WITH 636

CHOLECYSTITIS
    ADOLESCENTS 812
    SURGERY
        SEQUELAE 813

CHOLECYSTOKININ
    BILIARY TRACT
        MOTILITY 56
    HORMONE
        INTESTINE 77
    PANCREAS
        SECRETION 135
    STOMACH
        SECRETION 112

CHOLEDOCHOLITHIASIS
    CHOLESTEROL 826

CHOLELITHIASIS
    ANGIOGRAPHY 827
    CHILDREN 833
    COLON
        OBSTRUCTION 572
    DIAGNOSIS 831
    DRUG TREATMENT
        BILE ACIDS 835
    ETIOLOGY 831
        BILE ACIDS 815
    GALLBLADDER 823
    PREVENTION 148
    THERAPY 831

CHOLERA
    INTESTINE
        MUCOSA 455
    MORPHOLOGY
        MUCOSA 455

- CHOLESTASIS
  - HEPATITIS, CHRONIC
    - ELECTRON MICROSCOPY 775
  - LIVER DISEASE
    - BILE ACIDS 792*

- CHOLESTEROL
  - BRAIN
    - LIVER DISEASE, ALCOHOLIC 787
  - CHOLEDOCHOLITHIASIS 826
  - SMALL INTESTINE
    - SURGERY 443

- CHOLINERGIC AGENTS
  - ACID SECRETION
    - STOMACH 83*, 88*

- CHOLINESTERASE
  - GASTROINTESTINAL TRACT
    - MORPHOLOGY 15

- CHYMOTRYPSIN
  - PANCREAS
    - SECRETION 129*

- CIRCADIAN RHYTHM
  - SECRETION
    - GASTRIN 90*

- CIRCULATION
  - ABSORPTION
    - LIPIDS 41*
  - BILIARY TRACT
    - OBSTRUCTION 169
  - DRUG EFFECTS ON
    - CIRRHOSIS 802
  - GASTROINTESTINAL 192
  - LARGE INTESTINE
    - NEOPLASMS 876
  - LIVER 152, 169, 681
    - PHOSPHATASE, ACID 166
    - SHOCK 165
  - MANOMETRY
    - INTESTINE 188
    - STOMACH 188
  - PERITONEUM
    - IMMUNOLOGY 196
  - PORTOGRAPHY 193
  - PROSTAGLANDIN
    - STOMACH 82*
  - SMALL INTESTINE
    - HYPERTROPHY 444
    - HYPOTENSION 189
  - STOMACH
    - MICROSCOPY 194
    - PROSTAGLANDINS 190*

- CIRRHOSIS 761
  - ACIDITY
    - ASCITES 809
  - ANTIBODIES
    - GENETICS 793*
  - ANTIGEN, AUSTRALIA 800
    - EPIDEMIOLOGY 717*, 753
  - BILIARY
    - ANTIGEN, AUSTRALIA 791*
  - BILIRUBIN
    - COMPOSITION 807
  - CARBOHYDRATE
    - METABOLISM 684
  - DIAGNOSIS
    - BIOPSY 672
    - IMMUNOLOGY 249
  - DRUG EFFECTS ON
    - CIRCULATION 802
  - DRUG METABOLISM 798
  - DYSENTERY
    - TOXIN 100
  - GENETICS
    - PORTAL HYPERTENSION 794*
    - TELANGIECTASIA 794*
  - IMMUNOGLOBULINS
    - LYMPHATICS 797*
  - IMMUNOLOGY 801
  - INTESTINE
    - MALABSORPTION 804
  - LIVER DISEASE, ALCOHOLIC
    - CHEMOTAXIS 783*
    - DIAGNOSIS 805
  - MALABSORPTION
    - DISEASES ASSOCIATED WITH 529
  - NEONATE
    - FETOPROTEIN, ALPHA 799
  - PARENCHYMA
    - MORPHOLOGY 803
  - PERFUSION
    - SURVIVAL 796*
  - PORTACAVAL SHUNT 810
  - PROTEIN
    - LYMPHATICS 797*
  - SALIVARY GLANDS 806
  - SHUNT
    - SURVIVAL 795*
  - SMALL INTESTINE
    - MORPHOLOGY 808

- COENZYMES
  - GASTROINTESTINAL
    - NEOPLASMS, MALIGNANT 343
  - LIVER
    - GLUCONEOGENESIS 147
  - METABOLISM
    - CARBON TETRACHLORIDE 99

- COLITIS
  - SEE ALSO ULCERATIVE COLITIS
  - INTESTINE
    - EPITHELIUM 434*
  - ISCHEMIA 583, 598
    - DRUG-INDUCED 544
    - HORMONE 544

- COLLAGEN DISEASES
  - GASTROINTESTINAL
    - DISEASES 844
  - INTUSSUCEPTION
    - DISEASES ASSOCIATED WITH 877

- COLON
  - SEE ALSO LARGE INTESTINE
  - ANOMALY
    - SURGERY 461
  - COMPLICATIONS
    - DIVERTICULUM 576
  - CROHNS DISEASE 614
  - DILATATION
    - PREGNANCY 556
  - DIVERTICULUM 546, 569
    - BLEEDING 538*
    - COMPLICATIONS 543
    - DIET 533*, 567
    - DIETARY FACTORS 571, 605
    - DRUG EFFECTS ON 605
  - FISTULA
    - DIVERTICULUM 576
    - FOREIGN BODIES 587

    - SURGERY 450
  - LYMPHATICS
    - DILATATION 575
  - NEOPLASMS, BENIGN 585
    - FAMILIAL DISEASE 557, 565
    - IMMUNOLOGY 536*
    - LYMPHOCYTE 536*
  - NEOPLASMS, MALIGNANT 534*
    - CHEMOTHERAPY 582
    - CONNECTIVE TISSUE 551
    - DIETARY FACTORS 571
    - EXPERIMENTAL 454, 579, 596
    - FISTULA 589
    - IMMUNOGLOBULINS 539*, 558
    - IMMUNOLOGY 532*, 536*, 578, 580
    - IMMUNOTHERAPY 581
    - MUCOSA 454
    - SURGERY 552
  - OBSTRUCTION
    - CHOLELITHIASIS 572
  - RUPTURE
    - ACCIDENT 562
  - TRAUMA
    - EXPERIMENTAL 535*
  - ULCERATIVE COLITIS
    - CROHNS DISEASE 609

- COMA
  - LIVER
    - TREATMENT 748

- COMA, HEPATIC
  - PERFUSION
    - SURVIVAL 796*

- COMPLICATIONS
  - AMEBIASIS 890
  - DIARRHEA 883
  - ESOPHAGUS
    - DIAGNOSIS 309
  - GASTRITIS
    - BLEEDING 317*
  - HERNIA, HIATUS
    - BLEEDING 288
  - LIVER
    - SCANNING, SCINTILLATION 246
    - TRAUMA 674
  - MESENTERY
    - TRAUMA 867
  - PEPTIC ULCER
    - DRUG TREATMENT 408
  - PERITONEUM
    - TRAUMA 867
  - STOMACH
    - SURGERY 330
  - TRANSFUSION
    - ENTEROCOLITIS 882
  - ULCERATIVE COLITIS 604

- MPOSITION
  - BILE
    - ANTIBIOTICS 177
  - BILE ACIDS
    - PREGNANCY 139*
  - BILIARY TRACT
    - BILE ACIDS 141*
  - BILIRUBIN
    - CIRRHOSIS 807
  - FECES
    - FATTY ACID 488*
    - GAS 491*
    - LIPIDS 491*
  - LACTASE
    - LACTOSE INTOLERANCE 489*, 490*
  - SMALL INTESTINE
    - KIDNEY DISEASE 12
    - PROTEIN 12

- COMPUTERS
  - GASTROINTESTINAL
    - DIAGNOSIS 850

- CONNECTIVE TISSUE
  - NEOPLASMS, MALIGNANT
    - COLON 551
    - RECTUM 551

- CONSTIPATION
  - CELIAC DISEASE
    - AGE FACTORS 492*
    - CHILDREN 519

- CONSTITUTIONAL FACTORS
  - ACID SECRETION
    - PEPTIC ULCER 417
  - ULCER
    - DUODENUM 426

- CONTRAST MEDIA
  - BILE
    - SECRETION 830
  - LIVER
    - METABOLISM 156
    - SECRETION 156
  - SMALL INTESTINE
    - ABSORPTION 18*

- COPPER
  - LIVER
    - LIVER DISEASES 653*
  - METABOLISM
    - WILSONS DISEASE 654*

- CORTICOSTEROIDS
  - ACID SECRETION
    - ACETIC ACID 87*
    - STOMACH 87*
  - HEPATITIS
    - THERAPY 168
  - INTESTINE
    - MUCOSA 441
    - VILLI 441
  - LIVER
    - ENZYMES 153
  - PANCREATITIS
    - DRUG TREATMENT 637
  - PERITONITIS
    - DRUG TREATMENT 838*
  - RETROPERITONEAL
    - FIBROSIS 854
  - SODIUM
    - TRANSPORT 27
  - STOMACH
    - MUCOSA 319*

- CROHNS DISEASE
  - COLON 614
  - DIAGNOSIS 478, 479
    - IMMUNOLOGY 858
    - RADIOLOGY 481
  - DISEASES ASSOCIATED WITH 479
  - DRUG TREATMENT 483
  - EPIDEMIOLOGY 482
  - ETIOLOGY
    - ETHNIC FACTORS 480
  - INTESTINE
    - EPITHELIUM 434*
  - LARGE INTESTINE
    - ULCERATIVE COLITIS 611

- RECTUM
    - SURGERY 610
- REVIEWS 481
- SURGERY 478
- ULCERATIVE COLITIS
    - COLON 609

CRYOSURGERY
- HEMORRHOIDS 577

CYSTIC FIBROSIS
- INTESTINE
    - OBSTRUCTION 475
- PANCREAS
    - VITAMIN A 628
    - VITAMIN E 628

CYTOLOGY
- RECTUM
    - DIAGNOSIS 570
    - DIVERTICULUM 570
    - PROCTOCOLITIS 570
- SIGMOID
    - DIAGNOSIS 570
    - PROCTOCOLITIS 570

DEFECATION
- DRUG EFFECTS ON 74

DEFICIENCY
- ABSORPTION
    - FOLIC ACID 44
- VITAMIN B1
    - LIVER 175
- VITAMIN K
    - PROTHROMBIN 670

DERMATITIS HERPETIFORMIS
- JEJUNUM
    - MUCOSA 432*

DIABETES MELLITUS
- PANCREATITIS
    - DISEASES ASSOCIATED WITH 644
- SMALL INTESTINE
    - DISACCHARIDASE 7*

DIAGNOSIS
- ABDOMEN
    - ECHOGRAPHY 243
- ACHALASIA
    - PRESSURE STUDIES 199*
- AMEBIASIS
    - IMMUNOLOGY 858
    - TECHNIQUES 905
- ANOMALY, CONGENITAL
    - ANUS 595
    - RECTUM 595
- ANTIGEN, AUSTRALIA 757
- BILIARY TRACT
    - ANGIOGRAPHY 200*, 260
    - PRESSURE STUDIES 53
    - RADIOLOGY 203, 215
    - SECRETION 53
- CELIAC DISEASE
    - ANOREXIA 526
    - DISEASES ASSOCIATED WITH 527
    - REVIEWS 518
    - TECHNIQUES 506
- CHOLELITHIASIS 831
- CIRRHOSIS
    - BIOPSY 672
    - IMMUNOLOGY 249
- CROHNS DISEASE 478, 479
    - IMMUNOLOGY 858
    - RADIOLOGY 481
- DUODENUM
    - ENDOSCOPY 204, 215, 222
    - ULCER 248
- DYSPEPSIA
    - ACID SECRETION 229
- DYSPHAGIA
    - ENDOSCOPY 327
    - RADIOLOGY 269*
- ESOPHAGUS
    - ANTICHOLINERGIC AGENTS 268*
    - BIOPSY 197*
    - COMPLICATIONS 309
    - ENDOSCOPY 197*, 259
    - MORPHOLOGY 253
    - OBSTRUCTION 268*
    - PRESSURE STUDIES 199*, 263*, 2
    - RADIOLOGY 264*
    - REFLUX 252, 263*
    - TECHNIQUES 252, 253
    - VARICES 218, 264*
- GALLBLADDER
    - RADIOLOGY 18*, 245
- GASTRITIS
    - BIOPSY 352
    - ENDOSCOPY 240
- GASTROINTESTINAL
    - BIOPSY 208
    - BLEEDING 270
    - COMPUTERS 850
    - ELECTROPHYSIOLOGY 212
    - ENDOSCOPY 208, 211
    - NEOPLASMS, MALIGNANT 241, 343
    - RADIOTELEMETRY 257
    - TECHNIQUES 234
- GIARDIASIS 889
- HEPATITIS
    - BIOPSY 223
    - IMMUNOLOGY 249
- HEPATITIS, CHRONIC
    - BIOPSY 672
    - LIVER FUNCTION TESTS 673
- HEPATITIS, VIRAL 231
    - IMMUNOLOGY 228, 230, 261
    - LIVER FUNCTION TESTS 261
- HODGKINS DISEASE 233
    - LIVER 198*
- HYPERBILIRUBINEMIA 700
- JAUNDICE
    - ANGIOGRAPHY 256
    - ENDOSCOPY 219
    - RADIOLOGY 224
- JAUNDICE, OBSTRUCTIVE
    - BIOPSY 209
    - ENZYMES 209
    - RADIOLOGY 209
    - TECHNIQUES 699
- LARGE INTESTINE
    - ENDOSCOPY 203
    - RADIOLOGY 206
- LIVER
    - ABSCESS 255
    - ANGIOGRAPHY 262
    - ECHINOCOCCOSIS 213, 908
    - ECHOGRAPHY 250
    - ENDOSCOPY 219
    - INJURY 210
    - NEOPLASMS, MALIGNANT 217, 657
    - SCANNING, SCINTIGRAPHY 226
    - TECHNIQUES 210
    - TRAUMA 262

- LIVER DISEASE, ALCOHOLIC
  - BIOCHEMISTRY 785
  - CIRRHOSIS 805
- MALABSORPTION
  - XYLOSE 528
- MEGAESOPHAGUS 299
- MENTRIERS DISEASE
  - CHILDREN 363
- NEOPLASMS, MALIGNANT
  - MUCOPOLYSACCHARIDE 537*
  - PANCREAS 622, 626
- PANCREAS
  - BIOPSY 239
  - ECHOGRAPHY 238, 250
  - ENDOSCOPY 239
  - NEOPLASMS 235
  - RADIOLOGY 203, 215, 260
  - SCANNING, SCINTILLATION 205, 237
  - TECHNIQUES 621, 624
- PANCREATIC DUCT
  - RADIOLOGY 236
- PANCREATITIS 643, 646
  - PANCREAS FUNCTION TESTS 227
  - RADIOLOGY 236
  - TECHNIQUES 642
- PARASITES AND PARASITIC DISEASE
  - TECHNIQUES 905
- PEPTIC ULCER 428
  - ACID SECRETION 225, 229
  - ANGIOGRAPHY 405
  - ENDOSCOPY 207
  - RADIOLOGY 248
- PYLORUS
  - STENOSIS 202
  - TECHNIQUES 254
- RECTUM
  - CYTOLOGY 570
- SIGMOID
  - CYTOLOGY 570
- SMALL INTESTINE
  - BIOPSY 214, 242
  - ENDOSCOPY 203
- STOMACH 220
  - ACID SECRETION 232, 251
  - AUTORADIOGRAPHY 216
  - BIOPSY 216
  - COMPLICATIONS 341
  - ENDOSCOPY 207, 244, 258
  - GASTRITIS 341
  - NEOPLASMS, BENIGN 207
  - NEOPLASMS, MALIGNANT 221, 339, 350, 354, 366
  - RADIOLOGY 201, 339
  - SECRETION 102
- ULCERATIVE COLITIS
  - AMEBIASIS 617
  - IMMUNOLOGY 858
  - RADIOLOGY 247
- XYLOSE
  - ABSORPTION 508
- ZOLLINGER-ELLISON SYNDROME 875
  - TECHNIQUES 338

LYSIS
- HEPATITIS, VIRAL
  - PREVENTION 743
  - TREATMENT 716*
- PERITONITIS
  - THERAPY 837*

RRHEA
- BACTERIA
  - CHILDREN 878
  - IMMUNOLOGY 879
- CARBOHYDRATE
  - FECES 509
  - INTOLERANCE 493*
- CHILDREN
  - LACTOSE INTOLERANCE 509
- COMPLICATIONS 883
- DISEASES ASSOCIATED WITH 871
  - NERVOUS SYSTEM 841
- ETIOLOGY 488*
  - CHILDREN 880
  - ENVIRONMENTAL FACTORS 855
  - HORMONE 884
  - MALABSORPTION 507
- PARASITES AND PARASITIC DISEASE
  - EPIDEMIOLOGY 900
- SEQUELAE
  - PHOTOTHERAPY 695

DIET
- COLON
  - DIVERTICULUM 533*, 567
- LIVER
  - ULTRASTRUCTURE 8*

DIETARY FACTORS
- ABSORPTION
  - CALCIUM 39*
- AMINO ACIDS
  - TRANSPORT 45
- CELIAC DISEASE
  - ALLERGY 486*, 487*, 498
- COLON
  - DIVERTICULUM 571, 605
  - NEOPLASMS, MALIGNANT 571
- ESOPHAGUS
  - NEOPLASMS, MALIGNANT 306
  - PRESSURE STUDIES 49*
- FATTY LIVER 162
- GAS, INTESTINAL 179
- LIVER
  - GLYCOGEN 173
- STOMACH
  - ELECTROPHYSIOLOGY 66
- ULCERATIVE COLITIS
  - MOTILITY 605

DIGESTION
- ENTEROCOLITIS
  - CHRONIC 435*
  - ENZYMES 435*

DILATATION
- COLON
  - PREGNANCY 556
- ESOPHAGUS
  - ACHALASIA 294
  - ATRESIA 310
  - STRICTURE 284, 295
- LYMPHATICS
  - COLON 575
- STOMACH 333

DISACCHARIDASE
- SEE ALSO LACTASE
- SMALL INTESTINE
  - DIABETES MELLITUS 7*

DISEASES
- AMINO ACID
  - METABOLISM 671
- BILE
  - THYROID 94
- BILE TRACT 824
- BILIARY TRACT 821

- GASTROINTESTINAL
  - COLLAGEN DISEASES 844
  - DRUG TREATMENT 870
  - ENZYMES 870
  - GENETICS 856
  - IMMUNOLOGY 846
  - TRYPANOSOMIASIS 857

- DISEASES ASSOCIATED WITH
  - ACHLORHYDRIA
    - SJOGRENS SYNDROME 292
  - ANOMALIES 496
  - CELIAC DISEASE 495
    - DIAGNOSIS 527
  - CROHNS DISEASE 479
  - DIARRHEA 871
    - NERVOUS SYSTEM 841
  - DUODENUM
    - DIVERTICULUM 346
  - DYSPHAGIA 269*
  - ESOPHAGITIS, REFLUX
    - SJOGRENS SYNDROME 292
  - ESOPHAGUS
    - NEOPLASMS, MALIGNANT 847
    - STRICTURE 295
    - VARICES 270
  - FATTY LIVER
    - MUSCULOSKELETAL SYSTEM 656*
    - PREGNANCY 661
  - GASTRITIS 349
    - PEPTIC ULCER 316*
    - SJOGRENS SYNDROME 292
  - HEMORRHOIDS
    - DIVERTICULUM 594
  - HEPATITIS, NONVIRAL
    - MUSCULOSKELETAL SYSTEM 656*
  - HEPATITIS, SERUM
    - KIDNEY 732
    - NERVOUS SYSTEM 732
  - HEPATITIS, VIRAL
    - MUSCULOSKELETAL SYSTEM 718*
    - PARATHYROID GLAND 760
  - INTUSSUCEPTION
    - COLLAGEN DISEASES 877
  - ISCHEMIA
    - ENTEROCOLITIS 840*
  - JAUNDICE
    - LEUKEMIA 686
  - LACTOSE INTOLERANCE
    - LACTASE DEFICIENCY 501
  - LARGE INTESTINE
    - DIVERTICULUM 594
  - MALABSORPTION 496
    - CIRRHOSIS 529
    - ENTERITIS 528
    - ETIOLOGY 512
    - VITAMIN D 525
  - MESENTERY
    - THROMBOSIS 840*
  - PANCREAS
    - ANOMALY 346
  - PANCREATITIS
    - CHOLANGITIS 636
    - DIABETES MELLITUS 644
    - JAUNDICE, OBSTRUCTIVE 647
    - PREGNANCY 661
    - RESPIRATORY SYSTEM 638
    - STENOSIS 647
  - PARASITES AND PARASITIC DISEASE
    - ANEMIA 894
  - PEPTIC ULCER 225, 270, 376*, 377*, 379, 384, 404
  - PROTEIN-LOSING ENTEROPATHY
    - PREGNANCY 661
  - SMALL INTESTINE
    - LYMPHATICS 458
    - SURGERY 443
  - STOMACH
    - DIVERTICULUM 356
    - NEOPLASMS, MALIGNANT 329
    - SURGERY 313*
    - ULCER 370*
  - ULCER
    - DUODENUM 398
    - STOMACH 398
  - ULCERATIVE COLITIS
    - HYPERTENSION 606
  - VOLVULUS
    - SMALL INTESTINE 496
  - WILSONS DISEASE
    - GLUCOSE INTOLERANCE 663

- DISTOMIASIS
  - LIVER
    - DRUG TREATMENT 898

- DIURETICS
  - ACID SECRETION
    - STOMACH 101
  - SMALL INTESTINE
    - ION TRANSPORT 32

- DIVERTICULUM
  - APPENDIX 588
  - COLON 546, 569
    - BLEEDING 538*
    - COMPLICATIONS 543, 576
    - DIET 533*, 567
    - DIETARY FACTORS 571, 605
    - DRUG EFFECTS ON 605
    - FISTULA 576
  - DUODENUM
    - DISEASES ASSOCIATED WITH 346
    - PERFORATION 439
    - PYLOROPLASTY 438
    - VAGOTOMY 438
  - ESOPHAGUS 273
  - GALLBLADDER 823
  - GASTROINTESTINAL
    - AGE FACTORS 845
  - HEMORRHOIDS
    - DISEASES ASSOCIATED WITH 594
  - ILEUM 476
  - LARGE INTESTINE
    - DISEASES ASSOCIATED WITH 594
  - RECTUM
    - CYTOLOGY 570
  - SMALL INTESTINE
    - BACTERIA 437
  - STOMACH
    - DISEASES ASSOCIATED WITH 356

- DIVERTICULUM, ZENKERS
  - ETIOLOGY 304
  - SURGERY 304

- DOWNS SYNDROME
  - ANTIGEN, AUSTRALIA
    - HEPATITIS, VIRAL 715*
  - HEPATITIS, VIRAL
    - ANTIGEN, AUSTRALIA 720*

- DRUG ADDICTION
  - HEPATITIS, CHRONIC 770*

- DRUG EFFECTS ON
  - ABSORPTION
    - SUGAR 36

- ALCOHOL
  - METABOLISM 782*
- CIRCULATION
  - CIRRHOSIS 802
- COLON
  - DIVERTICULUM 605
- DEFECATION 74
- ENDOTOXIN
  - ABSORPTION 37*
  - TOXICITY 37*
- IRON
  - ABSORPTION 17*
- LARGE INTESTINE
  - ELECTROPHYSIOLOGY 70
- LIVER
  - SECRETION 746
- LIVER FUNCTION TESTS
  - ORAL CONTRACEPTIVES 675
- LIVER, NONVIRAL
  - ENZYMES 707*
- PANCREAS
  - SECRETION 135
- PANCREATIC DUCT
  - MOTILITY 59
- PEPSIN 371*
- PEPTIC ULCER
  - ACID SECRETION 397
- SMALL INTESTINE
  - ION TRANSPORT 32
- STOMACH
  - ACID SECRETION 395
  - MUCOSA 319*, 348
  - SECRETION 122
- ULCERATIVE COLITIS
  - MOTILITY 605

DRUG-INDUCED
- COLITIS
  - ISCHEMIA 544
- ESOPHAGITIS
  - ANTIBIOTICS 281
- HEMATOMA
  - ANTICOAGULANTS 451, 468
  - INTESTINE 468
- HEPATITIS, NONVIRAL
  - ANESTHETICS 710, 711, 713
  - ANTIBIOTICS 705*, 709
  - ANTIEPILEPTICS 712
  - ANTIMETABOLITES 706*
  - GENETICS 705*
  - TRANQUILIZERS 704*
- INTESTINAL
  - OBSTRUCTION 408
- MALABSORPTION 521
- SMALL INTESTINE
  - HEMATOMA 451
- STOMACH
  - NECROSIS 364

RUG METABOLISM
- CIRRHOSIS 798

RUG TREATMENT
- AMEBIASIS 892, 899, 901
- CHOLELITHIASIS
  - BILE ACIDS 835
- CROHNS DISEASE 483
- DUODENUM
  - ULCER 371*
- DYSPEPSIA 290
- ESOPHAGITIS 415
  - ANALGESICS 360
- ESOPHAGITIS, REFLUX 290
- GASTRITIS 290
  - ANALGESICS 360
- GASTROINTESTINAL
  - ANTICHOLINERGIC AGENTS 851, 852
  - DISEASES 870
  - TRANQUILIZERS 852
- GIARDIASIS 889
- HEARTBURN
  - PREGNANCY 296
- HEMORRHOIDS 586, 599
- HEPATITIS, CHRONIC 773*
- HEPATITIS, VIRAL 746, 755
- HORMONE
  - ILEUS 452
- LIVER
  - DISTOMIASIS 898
- PANCREAS
  - NECROSIS 625
- PANCREATITIS
  - ANTIENZYMES 645
  - CORTICOSTEROIDS 637
- PEPTIC ULCER 290, 397, 415, 416
  - ACID SECRETION 395
  - ANALGESICS 360
  - ANTISECRETORY AGENTS 375*
  - COMPLICATIONS 408
  - PAIN 424
- PERITONITIS
  - ANTIBIOTICS 881
  - CORTICOSTEROIDS 838*
- PROTEIN
  - PEPTIC ULCER 116
- STOMACH
  - BLEEDING 314*
  - ULCER 420
- ULCERATIVE COLITIS 483, 603*, 607

DRUGS
- BILE
  - SECRETION 25
- INTERACTIONS
  - ANESTHETICS 711
- RETROPERITONEAL
  - FIBROSIS 886
- SPECIES DIFFERENCES
  - ABSORPTION 25
  - METABOLISM 25
- STOMACH
  - ABSORPTION 42

DUBIN-JOHNSON SYNDROME
- METABOLISM
  - BROMSULPHALEIN 691

DUODENUM
- SEE ALSO SMALL INTESTINE
- ANOMALY, CONGENITAL 477
- ARTERY
  - ANGIOGRAPHY 568
- BIOPSY
  - ACCIDENT 442
- DIAGNOSIS
  - ENDOSCOPY 204, 215, 222
- DISEASES ASSOCIATED WITH
  - ULCER 398
- DIVERTICULUM
  - DISEASES ASSOCIATED WITH 346
  - PERFORATION 439
  - PYLOROPLASTY 438
  - VAGOTOMY 438
- ELECTROPHYSIOLOGY 68
- ENDOSCOPY
  - TECHNIQUES 260

- FISTULA
  - SURGERY 449, 450
- GASTRECTOMY
  - TRAUMA 474
- HEMATOMA
  - REVIEWS 465
  - TRAUMA 465
- MOTILITY 52
  - ELECTROPHYSIOLOGY 65
  - PENTAGASTRIN 75
  - PEPTIC ULCER 51
- NEOPLASMS, BENIGN 340
  - NERVOUS SYSTEM 318*
- NEOPLASMS, MALIGNANT 446, 472
  - NERVOUS SYSTEM 318*
- PERISTALSIS 52
- PRESSURE STUDIES 52
- RADIOLOGY
  - TECHNIQUES 347
- RUPTURE 448
- SECRETION
  - HEPARIN 126
- STENOSIS 463
- TRAUMA 456
- ULCER
- SEE ALSO PEPTIC ULCER
  - CONSTITUTIONAL FACTORS 426
  - DIAGNOSIS 248
  - DRUG TREATMENT 371*
  - GASTRIN 320*
  - OCCUPATIONAL FACTORS 865
  - PERFORATION 814
  - RECURRENCE 373*
  - SEQUELAE 403
  - SURGERY 326, 372*, 373*, 396
  - VAGOTOMY 390
- VILLI
  - NEOPLASMS, BENIGN 473

DYSENTERY
- TOXIN
  - CIRRHOSIS 100

DYSPEPSIA
- DIAGNOSIS
  - ACID SECRETION 229
- DRUG TREATMENT 290
- TREATMENT
  - VAGOTOMY 419

DYSPHAGIA
- DIAGNOSIS
  - ENDOSCOPY 327
  - RADIOLOGY 269*
- DISEASES ASSOCIATED WITH 269*

ECHINOCOCCOSIS
- LIVER
  - ANGIOGRAPHY 213
  - DIAGNOSIS 213, 908
  - SURGERY 907

ECHOGRAPHY
- ABDOMEN
  - DIAGNOSIS 243
- LIVER
  - ABSCESS 255
  - DIAGNOSIS 250
- PANCREAS
  - DIAGNOSIS 238, 250

ELECTRICAL CONTROL
- SMALL INTESTINE
  - MOTILITY 63
- STOMACH
  - MOTILITY 62, 63

ELECTROLYTE
- BILIARY TRACT
  - OBSTRUCTION 170
- METABOLISM
  - MALNUTRITION 862
- NEOPLASMS, BENIGN
  - RECTUM 601
- SECRETION 170
- STOMACH
  - SECRETION 220
- TRANSPORT
  - ENTERITIS 440
- VILLI
  - RECTUM 601

ELECTRON MICROSCOPY
- HEPATITIS, CHRONIC
  - ANTIGEN, AUSTRALIA 779
  - CHOLESTASIS 775
- LIVER
  - GILBERTS SYNDROME 697
  - JAUNDICE 697

ELECTROPHORESIS
- SERUM
  - PANCREATITIS 634*

ELECTROPHYSIOLOGY
- DUODENUM 68
  - MOTILITY 65
- GASTROINTESTINAL
  - DIAGNOSIS 212
- LARGE INTESTINE
  - DRUG EFFECTS ON 70
  - PERISTALSIS 64
- SMALL INTESTINE 69
  - HORMONE EFFECTS ON 71
  - MOTILITY 60, 61
  - PERISTALSIS 64
  - SEROTONIN 71
- STOMACH 67
  - DIETARY FACTORS 66
  - MOTILITY 57, 60
  - PENTAGASTRIN 66
  - VAGOTOMY 76
  - WATER 66

ENDOCRINE SYSTEM
- MALNUTRITION 862
- SODIUM
  - TRANSPORT 27
- STOMACH
  - MORPHOLOGY 3*
  - ULTRASTRUCTURE 10

ENDOPLASMIC RETICULUM
- LIVER
  - CHLORINATED TRIPHENYL 97

ENDOSCOPY
- DUODENUM
  - DIAGNOSIS 204, 215, 222
  - TECHNIQUES 260
- DYSPHAGIA
  - DIAGNOSIS 327
- ESOPHAGUS
  - DIAGNOSIS 197*, 259
- GASTRITIS
  - DIAGNOSIS 240
- GASTROINTESTINAL
  - BLEEDING 842

    - DIAGNOSIS 208, 211
  - JAUNDICE
    - DIAGNOSIS 219
  - LARGE INTESTINE
    - DIAGNOSIS 203
  - LIVER
    - DIAGNOSIS 219
    - NEOPLASMS, MALIGNANT 217
  - PANCREAS
    - DIAGNOSIS 239
  - PEPTIC ULCER
    - DIAGNOSIS 207
  - SMALL INTESTINE
    - DIAGNOSIS 203
  - STOMACH
    - BLEEDING 240
    - BLOOD FLOW 115
    - DIAGNOSIS 207, 244, 258

- ENDOTOXIN
  - ABSORPTION
    - DRUG EFFECTS ON 37*
  - LIVER
    - INJURY 140*
  - STOMACH
    - MOTILITY 334
  - TOXICITY
    - DRUG EFFECTS ON 37*

- NTERECTOMY
  - ADAPTATION 869
  - SURVIVAL 868

- NTERITIS
  - SEE ALSO REGIONAL ENTERITIS
  - ABDOMEN
    - ACUTE 460
  - HIRSCHSPRUNGS DISEASE
    - ILEUS 564
  - MALABSORPTION
    - DISEASES ASSOCIATED WITH 528
  - NEONATE
    - EXPERIMENTAL 440
  - TRANSPORT
    - ELECTROLYTE 440

- NTEROCOLITIS
  - CHRONIC
    - ABSORPTION 435*
    - DIGESTION 435*
    - MUCOSA 435*
  - ENZYMES
    - DIGESTION 435*
  - ISCHEMIA
    - DISEASES ASSOCIATED WITH 840*
  - PREVENTION 882
  - TRANSFUSION
    - COMPLICATIONS 882

- NVIRONMENTAL FACTORS
  - DIARRHEA
    - ETIOLOGY 855
  - PEPTIC ULCER 427
    - ETIOLOGY 376*
  - SODIUM
    - TRANSPORT 27

- ZYMES
  - BILE
    - THYROID 94
  - ENTEROCOLITIS
    - DIGESTION 435*
  - GASTROINTESTINAL
    - DISEASES 870
  - HEPATITIS, VIRAL 731
  - INDUCTION
    - SMALL INTESTINE 185
    - SUGAR 185
  - ISCHEMIA
    - INTESTINE 187
  - JAUNDICE, OBSTRUCTIVE
    - DIAGNOSIS 209
  - JEJUNUM
    - MUCOSA 432*
  - LIVER
    - ADENYLATE CYCLASE 154
    - AGE FACTORS 143*
    - CORTICOSTEROIDS 153
    - DRUG EFFECTS ON 707*
    - GLUCOSE 6 PHOSPHATE DEHYDROGENASE 143*
    - HORMONE 154
    - INJURY 140*
    - LIVER DISEASES 671, 678
    - RADIATION 153
    - THYROID 680
    - TISSUE CULTURE 172
    - TRANSKETOLASE 175
  - PANCREAS
    - MALNUTRITION 133
    - NECROSIS 625
    - SECRETION 132*
  - PANCREATITIS
    - HEALING 635*
  - SMALL INTESTINE
    - MUCOSA 453
  - THERAPY
    - LIVER DISEASES 683

- EPIDEMIOLOGY
  - AMEBIASIS 904
  - ANTIGEN, AUSTRALIA
    - CIRRHOSIS 717*, 753
    - NEOPLASMS, MALIGNANT 753
  - CROHNS DISEASE 482
  - HEPATITIS, VIRAL 737, 741, 745, 754, 763
    - ANTIGEN, AUSTRALIA 720*, 756
    - ETIOLOGY 740
    - IMMUNOLOGY 722*
    - NEONATE 728
    - PREGNANCY 768
  - LACTOSE INTOLERANCE 502, 505
    - ETHNIC FACTORS 494, 497
    - LACTASE DEFICIENCY 516
  - NEOPLASMS, MALIGNANT
    - PANCREAS 627
  - PARASITES AND PARASITIC DISEASE 891, 902, 904, 906
    - DIARRHEA 900
  - PEPTIC ULCER 388
  - SALMONELLOSIS 891
  - SCHISTOSOMIASIS 895, 903
  - SUCROSE
    - MALABSORPTION 504, 522

- EPITHELIUM
  - INTESTINE
    - COLITIS 434*
    - CROHNS DISEASE 434*
    - ULCERATIVE COLITIS 434*

- ERYTHROCYTE
  - BILIRUBIN
    - BINDING 694
    - SYNTHESIS 690*

- ESCHERICHIA COLI
  - ABSORPTION
    - CECUM 184

- ESOPHAGITIS
  - DRUG-INDUCED
    - ANTIBIOTICS 281
  - DRUG TREATMENT 415
    - ANALGESICS 360
  - FUNGUS 281

- ESOPHAGITIS, REFLUX
  - DISEASES ASSOCIATED WITH
    - SJOGRENS SYNDROME 292
  - DRUG TREATMENT 290
  - SEQUELAE
    - NEOPLASMS, MALIGNANT 303
  - SURGERY 271, 285

- ESOPHAGUS
  - ATRESIA
    - DILATATION 310
    - THERAPY 310
  - BLEEDING
    - SURGERY 297
  - DIAGNOSIS
    - ANTICHOLINERGIC AGENTS 268*
    - BIOPSY 197*
    - COMPLICATIONS 309
    - ENDOSCOPY 197*, 259
    - MORPHOLOGY 253
    - PRESSURE STUDIES 199*, 263*, 269*
    - RADIOLOGY 264*
    - TECHNIQUES 252, 253
  - DILATATION
    - ACHALASIA 294
  - DIVERTICULUM 273
  - FISTULAS
    - ANOMALIES, CONGENITAL 300
  - MORPHOLOGY 293
  - MOTILITY
    - ACHALASIA 280
    - NERVOUS CONTROL 267*, 275*
  - NEOPLASMS, BENIGN 289, 298
  - NEOPLASMS, MALIGNANT 279
    - DIETARY FACTORS 306
    - DISEASES ASSOCIATED WITH 847
    - ETIOLOGY 306
    - RADIOTHERAPY 291*, 308
    - SURGERY 278, 302
  - NERVOUS SYSTEM
    - MORPHOLOGY 266*, 280
  - OBSTRUCTION
    - DIAGNOSIS 268*
  - PERFORATION
    - NEONATE 305
    - TRAUMA 309
  - PRESSURE STUDIES 48*
    - DIETARY FACTORS 49*
    - GASTRIN 49*
  - REFLUX
    - DIAGNOSIS 252, 263*
  - RUPTURE
    - ETIOLOGY 272
    - REVIEW 287
  - SPHINCTER
    - HORMONE CONTROL 58
  - STENOSIS
    - SURGERY 285, 301
  - STRICTURE
    - DILATATION 284, 295
    - DISEASES ASSOCIATED WITH 295
    - SURGERY 295
  - SURGERY 286
    - TRAUMA 358
  - TRAUMA
    - PERFORATION 277
  - VARICES
    - DIAGNOSIS 218, 264*
    - DISEASES ASSOCIATED WITH 270
    - RADIOLOGY 218
    - SURGERY 283, 297, 307
    - VASOCONSTRICTORS 839*

- ETHIONINE
  - LIVER
    - CARCINOGENESIS 164
    - ULTRASTRUCTURE 164

- ETHNIC FACTORS
  - ANTIGEN, AUSTRALIA 751, 764
  - CROHNS DISEASE
    - ETIOLOGY 480
  - LACTOSE INTOLERANCE
    - EPIDEMIOLOGY 494, 497
  - SMALL INTESTINE
    - NEOPLASMS, MALIGNANT 849

- ETIOLOGY
  - ACHALASIA 266*
  - CHOLELITHIASIS 831
  - CROHNS DISEASE
    - ETHNIC FACTORS 480
  - DIARRHEA 488*
    - CHILDREN 880
    - ENVIRONMENTAL FACTORS 855
    - HORMONE 884
    - MALABSORPTION 507
  - DIVERTICULUM, ZENKERS 304
  - ESOPHAGUS
    - NEOPLASMS, MALIGNANT 306
    - RUPTURE 272
  - GASTROINTESTINAL
    - BLEEDING 288
  - HEPATITIS, CHRONIC 777
  - HEPATITIS, SERUM 726, 727
    - ANTIGEN, AUSTRALIA 729
  - HEPATITIS, VIRAL 744
    - EPIDEMIOLOGY 740
    - IMMUNOLOGY 738
  - LIVER
    - INJURY 155
    - NEOPLASMS, MALIGNANT 664
  - MALABSORPTION
    - ANKYLOSTOMIASIS 511
    - DISEASES ASSOCIATED WITH 512
    - REVIEWS 503
    - SCLERODERMA 524
    - TROPICAL SPRUE 517
  - MEGAESOPHAGUS 299
  - MENTRIERS DISEASE
    - ALLERGY 363
  - PANCREATITIS
    - CALCULI 639
    - CHILDREN 640
  - PEPTIC ULCER
    - ACID SECRETION 316*
    - ANOMALY 425
    - ENVIRONMENTAL FACTORS 376*
    - HYPOGLYCEMIA 384
    - SHOCK 405
  - SPRUE, TROPICAL
    - REVIEWS 510
  - STEATORRHEA
    - LACTASE DEFICIENCY 501
    - REVIEWS 515
  - ULCERATIVE COLITIS 604
  - WHIPPLES DISEASE
    - BACTERIA 484*

- EXCRETION
  - STEROID
    - BILE 78
- EXPERIMENTAL
  - ENTERITIS
    - NEONATE 440
  - LIVER DISEASE, ALCOHOLIC
    - METABOLISM 782*
  - NEOPLASMS, MALIGNANT
    - COLON 454, 579, 596
  - TRAUMA
    - COLON 535*
- AMILIAL DISEASE
  - NEOPLASMS, BENIGN
    - COLON 557, 565
    - RECTUM 557
  - RECTUM
    - PAIN 555
- ASTING
  - GASTRIN
    - SECRETION 120
- ATS
  - SEE LIPIDS, TRIGLYCERIDES
- ATTY ACIDS
  - ABSORPTION
    - BILE 24*
    - BILE ACIDS 24*
    - SMALL INTESTINE 24*
  - BRAIN
    - LIVER DISEASE, ALCOHOLIC 786
  - FECES
    - COMPOSITION 488*
- TTY LIVER
  - DIETARY FACTORS 162
  - DISEASES ASSOCIATED WITH
    - MUSCULOSKELETAL SYSTEM 656*
  - LIVER DISEASE, ALCOHOLIC
    - BIOPSY 789
  - METABOLISM
    - ALCOHOL 162
  - PREGNANCY
    - DISEASES ASSOCIATED WITH 661
- CES
  - CARBOHYDRATE
    - DIARRHEA 509
  - COMPOSITION
    - GAS 491*
    - LIPIDS 491*
  - FATTY ACID
    - COMPOSITION 488*
  - HEPATITIS, VIRAL
    - IMMUNOLOGY 725*
- EDING
  - ACID SECRETION
    - HEIDENHAIN POUCH 89*
  - HEIDENHAIN POUCH
    - CELLS 84*
- TOPROTEIN, ALPHA
  - CIRRHOSIS
    - NEONATE 799
  - LIVER
    - NEOPLASMS, MALIGNANT 657*
  - NEOPLASMS, MALIGNANT 816
  - SYNTHESIS
    - GASTROINTESTINAL TRACT 174
    - LIVER 174
- FIBROSIS
  - RETROPERITONEAL
    - CORTICOSTEROIDS 854
    - DRUGS 886
- FISTULA
  - ACID SECRETION
    - STOMACH 92*
  - COLON
    - DIVERTICULUM 576
    - FOREIGN BODIES 587
    - SURGERY 450
  - DUODENUM
    - SURGERY 449, 450
  - ESOPHAGUS
    - ANOMALIES, CONGENITAL 300
  - INTESTINE
    - APPENDECTOMY 592
  - NEOPLASMS, MALIGNANT
    - COLON 589
  - PEPTIC ULCER
    - PERFORATION 864
- FOLIC ACID
  - ABSORPTION
    - DEFICIENCY 44
    - LARGE INTESTINE 44
    - SMALL INTESTINE 44
  - SMALL INTESTINE
    - ABSORPTION 21*
- FOREIGN BODIES
  - COLON
    - FISTULA 587
  - PERITONITIS 838*
    - SIMULATION 860
  - STOMACH
    - THERAPY 362
- FUNGUS
  - ESOPHAGITIS 281
- GALLBLADDER
  - ANOMALY
    - CONGENITAL 825
  - CHOLELITHIASIS 823
  - DIAGNOSIS
    - RADIOLOGY 18*, 245
  - DIVERTICULUM 823
  - MORPHOLOGY
    - MUCOSA 6*
  - NEOPLASMS, MALIGNANT 816, 820, 828
  - POLYP 823
  - RADIOLOGY 830
  - SURGERY
    - SEQUELAE 822
  - VOLVULUS
    - CHILDREN 829
- GAS
  - FECES
    - COMPOSITION 491*
- GAS, INTESTINAL
  - DIETARY FACTORS 179
- GASTRECTOMY
  - SEE ALSO ANTRECTOMY
  - DUODENUM
    - TRAUMA 474
  - PEPTIC ULCER
    - MURAMIDASE 127
  - SEQUELAE
    - MUSCULOSKELETAL SYSTEM 332
    - TRAUMA 474

- GASTRIN
  - ACID SECRETION
    - HEIDENHAIN POUCH 89*
    - STOMACH 110
  - ANTRUM
    - ULTRASTRUCTURE 4*
  - BILIARY TRACT
    - MOTILITY 56
    - SECRETION 137
  - DUODENUM
    - ULCER 320*
  - ESOPHAGUS
    - PRESSURE STUDIES 49*
  - HORMONE
    - INTESTINE 77
  - PANCREAS
    - SECRETION 137
  - PEPTIC ULCER
    - SURGERY 320*
  - SECRETION
    - CATECHOLAMINES 118
    - CIRCADIAN RHYTHM 90*
    - FASTING 120

- GASTRITIS
  - COMPLICATIONS
    - BLEEDING 317*
  - DIAGNOSIS
    - BIOPSY 352
    - ENDOSCOPY 240
  - DISEASES ASSOCIATED WITH 349
    - PEPTIC ULCER 316*
    - SJOGRENS SYNDROME 292
  - DRUG TREATMENT 290
    - ANALGESICS 360
  - GASTROINTESTINAL
    - BLEEDING 355
  - STOMACH
    - DIAGNOSIS 341
    - MUCOSA 352
    - SURGERY 331
    - TUBERCULOSIS 353

- GASTRITIS, REFLUX
  - SURGERY 331

- GASTROINTESTINAL
  - ABSORPTION
    - AGE FACTORS 46
  - BLEEDING
    - ANTIINFLAMMATORY AGENTS 410, 411
    - ASPIRIN 848
    - DIAGNOSIS 270
    - ENDOSCOPY 842
    - ETIOLOGY 288
    - GASTRITIS 355
    - STRESS 315*
    - SURGERY 317*
    - TREATMENT 748
    - VASOCONSTRICTORS 839*
  - CIRCULATION 192
  - DIAGNOSIS
    - BIOPSY 208
    - COMPUTERS 850
    - ELECTROPHYSIOLOGY 212
    - ENDOSCOPY 208, 211
    - RADIOTELEMETRY 257
    - TECHNIQUES 234
  - DISEASES
    - COLLAGEN DISEASES 844
    - DRUG TREATMENT 870
    - ENZYMES 870
    - GENETICS 856
    - IMMUNOLOGY 846
    - TRYPANOSOMIASIS 857
  - DIVERTICULUM
    - AGE FACTORS 845
  - DRUG TREATMENT
    - ANTICHOLINERGIC AGENTS 851, 852
    - TRANQUILIZERS 852
  - HEMANGIOMATOSIS 887
  - INFLAMMATION
    - BACTERIA 866
  - INJURY
    - RADIATION 853
  - LEISHMANIASIS 897
  - MOTILITY
    - SURGERY 861
    - TECHNIQUES 212
  - NEOPLASMS
    - IMMUNOLOGY 859
  - NEOPLASMS, MALIGNANT
    - AGE FACTORS 872
    - CHEMOTHERAPY 888
    - COENZYMES 343
    - DIAGNOSIS 241, 343
    - INFECTION 863
  - SURGERY
    - ANTISPASMODICS 873
  - TRYPANOSOMIASIS
    - REVIEWS 893

- GASTROINTESTINAL TRACT
  - FETOPROTEIN, ALPHA
    - SYNTHESIS 174
  - MORPHOLOGY
    - CHOLINESTERASE 15

- GENETICS
  - CIRRHOSIS
    - ANTIBODIES 793*
    - PORTAL HYPERTENSION 794*
    - TELANGIECTASIA 794*
  - GASTROINTESTINAL
    - DISEASES 856
  - HEPATITIS, CHRONIC
    - ANTIBODIES 771*
  - HEPATITIS, NONVIRAL
    - DRUG-INDUCED 705*

- GIARDIASIS
  - AMEBIASIS 899
  - DIAGNOSIS 889
  - DRUG TREATMENT 889
  - XYLOSE
    - ABSORPTION 508

- GILBERTS SYNDROME
  - LIVER
    - ELECTRON MICROSCOPY 697

- GLUCAGON
  - HORMONE
    - INTESTINE 77
  - PEPTIC ULCER
    - SURGERY 321*
  - SMALL INTESTINE
    - TRANSPORT 31*
  - SUGAR
    - METABOLISM 321*

- GLUCONEOGENESIS
  - LIVER
    - COENZYMES 147
    - CONTROL 147

- GLUCOSE
  - TRANSPORT
    - SODIUM 30

- GLUCOSE INTOLERANCE
  - WILSONS DISEASE
    - DISEASES ASSOCIATED WITH 663

- GLUCOSE TOLERANCE TEST
  - STRESS 28

- GLUCOSE 6 PHOSPHATE DEHYDROGENASE
  - LIVER
    - ENZYMES 143*

- GLYCOGEN
  - LIVER
    - DIETARY FACTORS 173
    - STARVATION 173

- GRANULOMA
  - RECTUM
    - BARIUM 545

- GROWTH FACTOR
  - LIVER
    - TISSUE CULTURE 149*

- HEALING
  - PANCREATITIS
    - ENZYMES 635*

- HEARTBURN
  - PREGNANCY
    - DRUG TREATMENT 296

- HEIDENHAIN POUCH
  - CELLS
    - FEEDING 84*
  - FEEDING
    - ACID SECRETION 89*
  - GASTRIN
    - ACID SECRETION 89*
  - STOMACH
    - SECRETION 123
  - VAGOTOMY
    - ACID SECRETION 89*

- EMANGIOMATOSIS
  - GASTROINTESTINAL 887
  - LIVER
    - CHILDREN 658*

- EMATOMA
  - ANTICOAGULANTS
    - DRUG-INDUCED 451, 468
  - DUODENUM
    - REVIEWS 465
    - TRAUMA 465
  - INTESTINE
    - DRUG-INDUCED 468
  - SMALL INTESTINE
    - DRUG-INDUCED 451

- EMOCHROMATOSIS
  - IRON
    - METABOLISM 677

- EMODIALYSIS
  - HEPATITIS, VIRAL
    - ANTIGEN, AUSTRALIA 759

- EMOLYSIS
  - ALCOHOLIC LIVER DISEASE 780*
  - LIVER DISEASE, ALCOHOLIC 780*

- MORRHAGE
  - SEE BLEEDING

- HEMORRHOIDS
  - CRYOSURGERY 577
  - DIVERTICULUM
    - DISEASES ASSOCIATED WITH 594
  - DRUG TREATMENT 586, 599

- HEMOSIDEROSIS
  - LIVER DISEASE, ALCOHOLIC
    - PORTACAVAL SHUNT 781*

- HEPARIN
  - DUODENUM
    - SECRETION 126
  - STOMACH
    - SECRETION 126

- HEPATECTOMY
  - LIVER
    - NEOPLASMS, MALIGNANT 679

- HEPATITIS
  - DIAGNOSIS
    - BIOPSY 223
    - IMMUNOLOGY 249
  - PROTHROMBIN 670
  - THERAPY
    - CORTICOSTEROIDS 168

- HEPATITIS, CHRONIC
  - ANTIBODIES
    - MITOCHONDRIA 778
    - VIRUS 776
  - ANTIGEN, AUSTRALIA
    - ELECTRON MICROSCOPY 779
  - CHOLESTASIS
    - ELECTRON MICROSCOPY 775
  - DIAGNOSIS
    - BIOPSY 672
  - DIGANOSIS
    - LIVER FUNCTION TESTS 673
  - DRUG ADDICTION 770*
  - DRUG TREATMENT 773*
  - ETIOLOGY 777
  - GENETICS
    - ANTIBODIES 771*
  - IMMUNOLOGY 769*, 772*
  - LYMPHOCYTE
    - TRANSFORMATION 774*

- HEPATITIS, NONVIRAL
  - BACTERIA
    - BIOPSY 714
  - DISEASES ASSOCIATED WITH
    - MUSCULOSKELETAL SYSTEM 656*
  - DRUG-INDUCED
    - ANESTHETICS 710, 711, 713
    - ANTIBIOTICS 705*, 709
    - ANTIEPILEPTICS 712
    - ANTIMETABOLITES 706*
    - GENETICS 705*
    - TRANQUILIZERS 704*

- HEPATITIS, SERUM
  - DISEASES ASSOCIATED WITH
    - KIDNEY 732
    - NERVOUS SYSTEM 732
  - ETIOLOGY 726, 727
    - ANTIGEN, AUSTRALIA 729
  - PREVENTION 726, 727

- HEPATITIS, VIRAL
  - ANGIOTENSIN 761
  - ANTIGEN, AUSTRALIA 718*, 747, 750, 758, 762, 765, 767

  - DOWNS SYNDROME 715*, 720*
  - EPIDEMIOLOGY 720*
  - HEMODIALYSIS 759
  - NEONATE 719*
- BILIRUBIN 731
- CARBOHYDRATE
  - METABOLISM 684
- DIAGNOSIS 231
  - IMMUNOLOGY 228, 230, 261
  - LIVER FUNCTION TESTS 261
- DISEASES ASSOCIATED WITH
  - MUSCULOSKELETAL SYSTEM 718*
  - PARATHYROID GLAND 760
- DRUG TREATMENT 746, 755
- ENZYMES 731
- EPIDEMIOLOGY 737, 741, 745, 754, 763
  - ANTIGEN, AUSTRALIA 756
  - IMMUNOLOGY 722*
  - NEONATE 728
- ETIOLOGY 744
  - EPIDEMIOLOGY 740
  - IMMUNOLOGY 738
- IMMUNOLOGY 730, 734, 736
  - ANTIGEN, AUSTRALIA 724*, 725*
  - FECES 725*
  - PREVENTION 724*
  - TECHNIQUES 724*
- INCUBATION 749
- LIVER
  - MITOCHONDRIA 766
  - MORPHOLOGY 733
- PREGNANCY
  - EPIDEMIOLOGY 768
- PREVENTION 749
  - DIALYSIS 743
- PROTEIN
  - METABOLISM 742
- SERUM
  - PREVENTION 231
- TRANSMISSION
  - PREVENTION 739
- TREATMENT
  - DIALYSIS 716*

HEPATOSPLENOMEGALY
- NEONATE
  - IMMUNOGLOBULINS 665

HERNIA
- APPENDIX
  - STRANGULATION 561
- SURGERY
  - SEQUELAE 563

HERNIA, HIATUS
- COMPLICATIONS
  - BLEEDING 288
- SEQUELAE
  - NEOPLASMS, MALIGNANT 303
- STOMACH
  - COMPLICATIONS 276
- SURGERY 293
  - CHILDREN 265*
  - SEQUELAE 265*

HIRSCHSPRUNGS DISEASE
- ENTERITIS
  - ILEUS 564
- NERVOUS SYSTEM 531*
- REVIEWS 541

HISTAMINE
- ACID SECRETION
  - ADRENERGIC BLOCKING AGENTS 104
  - IMMUNOSUPPRESSION 92*
- PARIETAL CELL 113
- SECRETION
  - STOMACH 91*

HODGKINS DISEASE
- DIAGNOSIS 233
- JEJUNUM 462
- LIVER
  - BIOPSY 198*
  - DIAGNOSIS 198*
  - SCANNING, SCINTILLATION 198*

HOMOGENATE
- LIVER
  - ULTRASTRUCTURE 16

HORMONE
- ACID SECRETION
  - STOMACH 88*
- COLITIS
  - ISCHEMIA 544
- DIARRHEA
  - ETIOLOGY 884
- DRUG TREATMENT
  - ILEUS 452
- INTESTINE
  - CHOLECYSTOKININ 77
  - GASTRIN 77
  - GLUCAGON 77
  - INSULIN 77
  - SECRETIN 77
- LIVER
  - ENZYME 154
- METABOLISM
  - LIVER 150
- PANCREAS
  - SECRETION 134
- SECRETION
  - STOMACH 109, 111
- VASOPRESSIN
  - REVIEWS 195

HORMONE CONTROL
- ANTRUM
  - HORMONE CONTROL 58, 58
- BILIARY TRACT
  - MOTILITY 56
- ESOPHAGUS
  - SPHINCTER 58
- LIVER
  - ION TRANSPORT 145
- PYLORUS 58
- SMALL INTESTINE
  - TRANSPORT 31*
- STOMACH
  - ACID SECRETION 404
  - SECRETION 320*
- SUGAR
  - METABOLISM 321*

HORMONE EFFECTS ON
- SMALL INTESTINE
  - ELECTROPHYSIOLOGY 71

HYPERBILIRUBINEMIA
- DIAGNOSIS 700
- SERUM
  - ALBUMIN 701
- TRANSFUSION
  - NEONATE 689*

HYPERCHLORHYDRIA
- SEE ALSO ACID SECRETION

HYPERTENSION
    ULCERATIVE COLITIS
        DISEASES ASSOCIATED WITH 606

HYPERTROPHY
    SMALL INTESTINE
        CIRCULATION 444

HYPOCHLORHYDRIA
    SEE ALSO ACID SECRETION

HYPOGLYCEMIA
    PEPTIC ULCER
        ETIOLOGY 384

HYPOTENSION
    CIRCULATION
        SMALL INTESTINE 189

HYPOTHERMIA
    ABSORPTION
        LIPIDS 41*
    LIVER FUNCTION
        ALCOHOL 138*
        METABOLISM 138*

HYPOXIA
    SECRETION
        STOMACH 111

ICTERUS
    SEE JAUNDICE

ILEUM
    SEE ALSO SMALL INTESTINE
    ANOMALY
        SURGERY 461
    DIVERTICULUM 476
    PERFORATION
        POTASSIUM CHLORIDE 469

LEUS
    DRUG TREATMENT
        HORMONE 452
    HIRSCHSPRUNGS DISEASE
        ENTERITIS 564
    PREVENTION 861

MMUNOGLOBULINS
    HEPATOSPLENOMEGALY
        NEONATE 665
    LYMPHATICS
        CIRRHOSIS 797*
    NEOPLASMS, MALIGNANT
        COLON 539*, 558
    SMALL INTESTINE
        MUCOSA 430*
        SECRETION 181*
    STOMACH
        NEOPLASMS, MALIGNANT 329

MMUNOLOGY
    AMEBIASIS
        DIAGNOSIS 858
    ANEMIA, PERNICIOUS 312*
    CIRRHOSIS 801
        DIAGNOSIS 249
    CROHNS DISEASE
        DIAGNOSIS 858
    DIARRHEA
        BACTERIA 879
    GASTROINTESTINAL
        DISEASES 846
        NEOPLASMS 859
    HEPATITIS
        DIAGNOSIS 249
    HEPATITIS, CHRONIC 769*, 772*
    HEPATITIS, VIRAL 730, 734, 736
        ANTIGEN, AUSTRALIA 724*, 725*
        DIAGNOSIS 228, 230, 261
        EPIDEMIOLOGY 722*
        ETIOLOGY 738
        FECES 725*
        PREVENTION 724*
        TECHNIQUES 724*
    LIVER
        INJURY 155
        NEOPLASMS, MALIGNANT 668
        TRANSPLANTATION 167, 655*
    NEOPLASMS, BENIGN
        COLON 536*
    NEOPLASMS, MALIGNANT
        COLON 532*, 536*, 578, 580
        LYMPHATICS 596
        RECTUM 578
    PEPTIC ULCER 379
    PERITONEUM
        CIRCULATION 196
    SCHISTOSOMIASIS 896
    ULCERATIVE COLITIS
        DIAGNOSIS 858

IMMUNOSUPPRESSION
    ACID SECRETION
        ATROPINE 92*
        HISTAMINE 92*
        PENTAGASTRIN 92*

IMMUNOTHERAPY
    NEOPLASMS, MALIGNANT
        COLON 581

IN VITRO
    BILIRUBIN
        BINDING 694

INCUBATION
    HEPATITIS, VIRAL 749

INDUCTION
    ENZYMES
        SMALL INTESTINE 185
        SUGAR 185

INFARCTION
    INTESTINE
        TRAUMA 470

INFECTION
    BACTERIA
        KWASHIORKOR 520
    GASTROINTESTINAL
        NEOPLASMS, MALIGNANT 863
    SMALL INTESTINE
        VIRUS 453

INFECTION, BACTERIA
    BILIARY TRACT
        OBSTRUCTION 818

INFLAMMATION
    GASTROINTESTINAL
        BACTERIA 866
    IRON
        METABOLISM 33
    JEJUNUM
        SJOGRENS SYNDROME 843
    RECTUM
        SJOGRENS SYNDROME 843

- INHIBITION
  - ACID SECRETION
    - ALCOHOL 107
  - NUCLEIC ACIDS
    - SYNTHESIS 98
  - PROTEIN
    - SYNTHESIS 98
  - STOMACH
    - TRIGLYCERIDES 106

- INJURY
  - GASTROINTESTINAL
    - RADIATION 853
  - LIVER
    - CARBON TETRACHLORIDE 161, 163
    - DIAGNOSIS 210
    - ENDOTOXIN 140*
    - ENZYMES 140*
    - ETIOLOGY 155
    - IMMUNOLOGY 155
    - INSECTICIDES 171
    - IRON 146
    - PROTEIN 146
    - ULTRASTRUCTURE 163
    - VITAMIN A 171
    - VITAMIN E 161

- INSECTICIDES
  - LIVER
    - INJURY 171

- INSULIN
  - HORMONE
    - INTESTINE 77

- INTERACTIONS
  - DRUG
    - ANESTHETICS 711

- INTESTINE
  - SEE ALSO SMALL INTESTINE
  - ABSORPTION
    - BILIRUBIN 80
  - ADHESIONS
    - SURGERY 471
  - BLEEDING
    - TYPHOID 467
  - CELLS
    - ALCOHOL 182*
  - CIRCULATION
    - MANOMETRY 188
  - EPITHELIUM
    - COLITIS 434*
    - CROHNS DISEASE 434*
    - ULCERATIVE COLITIS 434*
  - FISTULA
    - APPENDECTOMY 592
  - HEMATOMA
    - DRUG-INDUCED 468
  - HORMONE
    - CHOLECYSTOKININ 77
    - GASTRIN 77
    - GLUCAGON 77
    - INSULIN 77
    - SECRETIN 77
  - INFARCTION
    - TRAUMA 470
  - ISCHEMIA 574
    - ENZYMES 187
  - MALABSORPTION
    - CIRRHOSIS 804
  - MOTILITY
    - LACTOSE INTOLERANCE 514
  - MUCOSA
    - ASPIRIN 441
    - CHOLERA 455
    - CORTICOSTEROIDS 441
  - OBSTRUCTION 464
    - CYSTIC FIBROSIS 475
    - DRUG-INDUCED 408
  - TRANSPORT
    - AMINO ACID 35
    - CALCIUM 34
    - SUGAR 35
    - TECHNIQUE 29
  - ULCER
    - NEONATE 597
  - VILLI
    - ASPIRIN 441
    - CORTICOSTEROIDS 441

- INTOLERANCE
  - CARBOHYDRATE
    - BACTERIA 493*
    - CHILDREN 493*
    - DIARRHEA 493*

- INTRINSIC FACTOR
  - ABSORPTION
    - SMALL INTESTINE 38*
    - VITAMIN B12 38*
  - BINDING
    - ACIDITY 85*
  - SECRETION
    - AGE FACTORS 103

- INTUBATION
  - JEJUNUM 457

- INTUSSUCEPTION
  - DISEASES ASSOCIATED WITH
    - COLLAGEN DISEASES 877

- ION TRANSPORT
  - LIVER
    - CALCIUM 145
    - HORMONE CONTROL 145
  - SMALL INTESTINE
    - ACIDITY 22*
    - BILE ACIDS 23*
    - DIURETICS 32
    - DRUG EFFECTS ON 32
    - MOTILITY 19*

- IRON
  - ABSORPTION
    - AGE FACTORS 46
    - DRUG EFFECTS ON 17*
    - SMALL INTESTINE 17*, 33
  - LIVER
    - INJURY 146
  - METABOLISM
    - HEMOCHROMATOSIS 677
    - INFLAMMATION 33
    - LIVER 675
    - LIVER DISEASES 676
  - SERUM
    - KWASHIORKOR 520

- ISCHEMIA
  - COLITIS 583, 598
    - DRUG-INDUCED 544
    - HORMONE 544
  - ENTEROCOLITIS
    - DISEASES ASSOCIATED WITH 840*
  - INTESTINE 574
    - ENZYMES 187

- SMALL INTESTINE 447
    - SHOCK 445

SOENZYMES
- PHOSPHATASE, ALKALINE
    - LIVER DISEASES 650*

AUNDICE
- ALCOHOL
    - INTERACTION 692
- DIAGNOSIS
    - ANGIOGRAPHY 256
    - ENDOSCOPY 219
    - RADIOLOGY 224
- DISEASES ASSOCIATED WITH
    - LEUKEMIA 686
- LIVER
    - ELECTRON MICROSCOPY 697
- METABOLISM
    - BROMSULPHALEIN 691
- NEONATAL 698
    - PHOTOTHERAPY 695
- NEONATE
    - PHOTOTHERAPY 703
    - TREATMENT 702
- NEOPLASMS, BENIGN 817

UNDICE, OBSTRUCTIVE
- DIAGNOSIS
    - BIOPSY 209
    - ENZYMES 209
    - RADIOLOGY 209
    - TECHNIQUES 699
- PANCREAS
    - ABERRATION 459
- PANCREATITIS
    - DISEASES ASSOCIATED WITH 647

JUNUM
- SEE ALSO SMALL INTESTINE
- HODGKINS DISEASE 462
- INFLAMMATION
    - SJOGRENS SYNDROME 843
- INTUBATION 457
- MOTILITY
    - PEPTIC ULCER 51
- MUCOSA
    - CHILDREN 432*
    - DERMATITIS HERPETIFORMIS 432*
    - ENZYMES 432*
- NEOPLASMS, MALIGNANT 466

DNEY
- HEPATITIS, SERUM
    - DISEASES ASSOCIATED WITH 732

DNEY DISEASE
- SMALL INTESTINE
    - COMPOSITION 12

ASHIORKOR
- BACTERIA
    - INFECTION 520
- SERUM
    - IRON 520
- SIMULATION
    - PANCREAS 133

TASE
- SEE ALSO DISACCHARIDASE
- COMPOSITION
    - LACTOSE INTOLERANCE 489*, 490*

LACTASE DEFICIENCY
- LACTOSE INTOLERANCE
    - DISEASES ASSOCIATED WITH 501
    - EPIDEMIOLOGY 516
- STEATORRHEA
    - ETIOLOGY 501
- SUCROSE
    - MALABSORPTION 504, 522

LACTOSE INTOLERANCE
- CHILDREN
    - DIARRHEA 509
- EPIDEMIOLOGY 502, 505
    - ETHNIC FACTORS 494, 497
- LACTASE
    - COMPOSITION 489*, 490*
- LACTASE DEFICIENCY
    - DISEASES ASSOCIATED WITH 501
    - EPIDEMIOLOGY 516
- MOTILITY
    - INTESTINE 514

LAMBLIASIS
- SEE GIARDIASIS

LARGE INTESTINE
- SEE ALSO INTESTINE, APPENDIX, CECUM, COLON, RECTUM, ANUS, SIGMOID
- ABSORPTION
    - FOLIC ACID 44
    - SUGAR 36
- ANGIOGRAPHY
    - COMPLICATIONS 550
- ANOMALY
    - CONGENITAL 548
- BACTERIA 183*
- CIRCULATION
    - NEOPLASMS 876
- CROHNS DISEASE
    - ULCERATIVE COLITIS 611
- DIAGNOSIS
    - ENDOSCOPY 203
    - RADIOLOGY 206
- DIVERTICULUM
    - DISEASES ASSOCIATED WITH 594
- ELECTROPHYSIOLOGY
    - DRUG EFFECTS ON 70
- NEOPLASMS, MALIGNANT 847
    - MULTIPLE 542
    - RADIOTHERAPY 584
    - SURVIVAL 849
- PERISTALSIS
    - ELECTROPHYSIOLOGY 64
- RADIATION
    - COMPLICATIONS 550

LEAD
- ABSORPTION
    - AGE FACTORS 46

LEISHMANIASIS
- GASTROINTESTINAL 897

LEUKEMIA
- JAUNDICE
    - DISEASES ASSOCIATED WITH 686

LIPASE
- PANCREAS
    - SECRETION 129*

LIPIDS
- BRAIN
    - LIVER DISEASE, ALCOHOLIC 787

- CIRCULATION
  - ABSORPTION 41*
- FECES
  - COMPOSITION 491*
- HYPOTHERMIA
  - ABSORPTION 41*
- LIVER
  - SYNTHESIS 159
- MALABSORPTION
  - BILE SALTS 523
- SMALL INTESTINE
  - ABSORPTION 41*

- LIPOPROTEINS
  - LIVER
    - ULTRASTRUCTURE 669
  - METABOLISM
    - LIVER 669

- LIVER
  - ABSCESS
    - DIAGNOSIS 255
    - ECHOGRAPHY 255
  - AMINO ACID
    - SYNTHESIS 160
  - AMINO ACIDS 45
  - ANTIGEN, AUSTRALIA
    - NEOPLASMS, MALIGNANT 753
  - BILE ACIDS 811*
  - BILIRUBIN
    - METABOLISM 696
  - BIOPSY
    - ANTIGEN, AUSTRALIA 715*
  - CARBOHYDRATE
    - METABOLISM 152
  - CARCINOGENESIS
    - ETHIONINE 164
  - CELLS
    - ANTIGEN, AUSTRALIA 717*, 721*, 723*
    - VIRUS 721*
  - CHEMICAL COMPOSITION
    - VITAMIN B12 687
  - CIRCULATION 152, 169, 681
    - PHOSPHATASE, ACID 166
    - SHOCK 165
  - COMA
    - TREATMENT 748
  - COPPER
    - LIVER DISEASES 653*
  - DIAGNOSIS
    - ANGIOGRAPHY 262
    - ECHOGRAPHY 250
    - ENDOSCOPY 219
    - SCANNING, SCINTIGRAPHY 226
    - TECHNIQUES 210
  - DISTOMIASIS
    - DRUG TREATMENT 898
  - ECHINOCOCCOSIS
    - ANGIOGRAPHY 213
    - DIAGNOSIS 213, 908
    - SURGERY 907
  - ELECTRON MICROSCOPY
    - GILBERTS SYNDROME 697
    - JAUNDICE 697
  - ENDOPLASMIC RETICULUM
    - CHLORINATED TRIPHENYL 97
  - ENZYME
    - ADENYLATE CYCLASE 154
    - HORMONE 154
    - TRANSKETOLASE 175
  - ENZYMES
    - AGE FACTORS 143*
    - CORTICOSTEROIDS 153
    - GLUCOSE 6 PHOSPHATE DEHYDROGENA 143*
    - LIVER DISEASES 671, 678
    - RADIATION 153
    - THYROID 680
  - FETOPROTEIN, ALPHA
    - SYNTHESIS 174
  - GLUCONEOGENESIS
    - COENZYMES 147
    - CONTROL 147
  - GLYCOGEN
    - DIETARY FACTORS 173
    - STARVATION 173
  - GROWTH
    - TISSUE CULTURE 93
  - HEMANGIOMATOSIS
    - CHILDREN 658*
  - HODGKINS DISEASE
    - BIOPSY 198*
    - DIAGNOSIS 198*
    - SCANNING, SCINTILLATION 198*
  - HOMOGENATE
    - ULTRASTRUCTURE 16
  - HORMONE
    - METABOLISM 150
  - INJURY
    - ANTIBIOTICS 708
    - CARBON TETRACHLORIDE 161, 163
    - DIAGNOSIS 210
    - ENDOTOXIN 140*
    - ENZYMES 140*
    - ETIOLOGY 155
    - IMMUNOLOGY 155
    - INSECTICIDES 171
    - IRON 146
    - PROTEIN 146
    - ULTRASTRUCTURE 163
    - VITAMIN A 171
    - VITAMIN E 161
  - ION TRANSPORT
    - CALCIUM 145
    - HORMONE CONTROL 145
  - IRON
    - METABOLISM 675
  - LIPID
    - SYNTHESIS 159
  - LIPOPROTEINS
    - METABOLISM 669
  - METABOLISM
    - ADENYLATE CYCLASE 154
    - ANILINE 178
    - CONTRAST MEDIA 156
    - TRIGLYCERIDE 142*
  - METASTASES
    - SURGERY 681
  - MITOCHONDRIA
    - HEPATITIS, VIRAL 766
  - MORPHOLOGY
    - LIVER DISEASES 685
    - MITOSIS 667
    - PIGMENTATION 676
  - NEOPLASMS, BENIGN
    - CHILDREN 666
  - NEOPLASMS, MALIGNANT
    - CHILDREN 666
    - DIAGNOSIS 217, 657*
    - ENDOSCOPY 217
    - ETIOLOGY 664
    - FETOPROTEIN, ALPHA 657*
    - HEPATECTOMY 679
    - IMMUNOLOGY 668
    - METASTASES 662
    - SCANNING, SCINTILLATION 217
    - SURGERY 652*

    SURVIVAL 679
  NUCLEIC ACIDS
    METABOLISM 157
  PERFUSION
    ULTRASTRUCTURE 176
  PHOSPHOLIPID
    SYNTHESIS 144*
  REGENERATION 149*
    ULTRASTRUCTURE 176
    VITAMIN B12 96
  SCANNING, SCINTILLATION
    COMPLICATIONS 246
  SECRETION
    CONTRAST MEDIA 156
    DRUG EFFECTS ON 746
  STEROID
    METABOLISM 78
  SURGERY
    NERVOUS SYSTEM 660
  TISSUE CULTURE
    ENZYME 172
    GROWTH FACTOR 149*
    METABOLISM 151
    TECHNIQUES 151
  TRANSPLANTATION
    IMMUNOLOGY 167, 655*
    MORPHOLOGY 655*
  TRAUMA
    COMPLICATIONS 674
    DIAGNOSIS 262
    SURGERY 674
  TRIGLYCERIDE
    SYNTHESIS 144*
  ULCERATIVE COLITIS
    ANTIBODIES 608
  ULTRASTRUCTURE 11, 13
    DIET 8*
    ETHIONINE 164
    LIPOPROTEINS 669
    LIVER DISEASES 678, 685
    NUCLEIC ACIDS 158
    PROTEIN 8*
    VITAMIN D 95
  VITAMIN B1
    DEFICIENCY 175

LIVER DISEASE, ALCOHOLIC
  BIOCHEMISTRY
    DIAGNOSIS 785
  BIOPSY 788
  BRAIN
    CHOLESTEROL 787
    FATTY ACIDS 786
    LIPIDS 787
    PHOSPHOLIPID 786
  CHEMOTAXIS
    CIRRHOSIS 783*
  DIAGNOSIS
    CIRRHOSIS 805
  FATTY LIVER
    BIOPSY 789
  HEMOLYSIS 780*
  LIVER FUNCTION TEST 790
  METABOLISM
    EXPERIMENT 782*
  PORTACAVAL SHUNT
    HEMOSIDEROSIS 781*
  REVIEWS 784

IVER DISEASES
  AMINO ACID
    METABOLISM 671, 685
  CHILDREN 653*
  CHOLESTASIS
    BILE ACIDS 792*
  COMPOSITION
    BILE ACIDS 792*
  ENZYMES
    THERAPY 683
  IRON
    METABOLISM 676
  LIVER
    COPPER 653*
    ENZYMES 671, 678
    MORPHOLOGY 685
    ULTRASTRUCTURE 678, 685
  PHOSPHATASE, ALKALINE
    ISOENZYMES 650*
  PHOSPHOLIPID
    TISSUE CULTURE 682
  SUGAR
    METABOLISM 659

LIVER FUNCTION
  HYPOTHERMIA
    ALCOHOL 138*
    METABOLISM 138*

LIVER FUNCTION TESTS
  DRUG EFFECTS ON
    ORAL CONTRACEPTIVES 675
  HEPATITIS, CHRONIC
    DIGANOSIS 673
  HEPATITIS, VIRAL
    DIAGNOSIS 261
  LIVER DISEASE, ALCOHOLIC 790
  REYES SYNDROME 651*

LYMPHATICS
  DILATATION
    COLON 575
  IMMUNOGLOBULINS
    CIRRHOSIS 797*
  NEOPLASMS, MALIGNANT
    IMMUNOLOGY 596
    RADIOTHERAPY 549
  PROTEIN
    CIRRHOSIS 797*
  SMALL INTESTINE
    DISEASES ASSOCIATED WITH 458

LYMPHOCYTE
  HEPATITIS, CHRONIC
    TRANSFORMATION 774*
  NEOPLASMS, BENIGN
    COLON 536*

MALABSORPTION
  CALCIUM 313*
  CARBOHYDRATE
    REVIEWS 513
  DIAGNOSIS
    XYLOSE 528
  DIARRHEA
    ETIOLOGY 507
  DISEASES ASSOCIATED WITH 496
    CIRRHOSIS 529
    ENTERITIS 528
  DRUG-INDUCED 521
  ETIOLOGY
    ANKYLOSTOMIASIS 511
    DISEASES ASSOCIATED WITH 512
    REVIEWS 503
    SCLERODERMA 524
    TROPICAL SPRUE 517
  INTESTINE
    CIRRHOSIS 804

- LIPID
  - BILE SALTS 523
- PANCREAS
  - SECRETION 500
- SMALL INTESTINE
  - NEOPLASMS, MALIGNANT 849
- SUCROSE
  - EPIDEMIOLOGY 504, 522
  - LACTASE DEFICIENCY 504, 522
- VITAMIN D
  - BLIND LOOP SYNDROME 525
  - DISEASES ASSOCIATED WITH 525

MALIGNANT
- SEE NEOPLASMS, MALIGNANT

MALNUTRITION
- ELECTROLYTE
  - METABOLISM 862
- ENDOCRINE SYSTEM 862
- PANCREAS
  - ENZYMES 133
  - MORPHOLOGY 133
- PROTEIN
  - METABOLISM 862
- TRIGLYCERIDE
  - METABOLISM 862
- XYLOSE
  - ABSORPTION 508

MANOMETRY
- SEE PRESSURE STUDIES

MECKELS DIVERTICULUM
- SURGERY 877

MEGACOLON
- ULCERATIVE COLITIS 612

MEGAESOPHAGUS
- DIAGNOSIS 299
- ETIOLOGY 299
- SURGERY 282*

MENTRIERS DISEASE
- DIAGNOSIS
  - CHILDREN 363
- ETIOLOGY
  - ALLERGY 363

MESENTERY
- THROMBOSIS
  - DISEASES ASSOCIATED WITH 840*
- TRAUMA
  - COMPLICATIONS 867

METABOLISM
- ALCOHOL
  - DRUG EFFECTS ON 782*
- AMINO ACID
  - AFFERENT LOOP SYNDROME 322*
  - DISEASES 671
  - LIVER DISEASES 671, 685
- ANOMALY
  - BILIRUBIN 693
- BILE SALTS
  - REVIEWS 523
- BILIRUBIN
  - LIVER 696
- BROMSULPHALEIN
  - DUBIN-JOHNSON SYNDROME 691
  - JAUNDICE 691
- CARBOHYDRATE
  - CARBON TETRACHLORIDE 99
  - CIRRHOSIS 684
  - HEPATITIS, VIRAL 684
  - LIVER 152
- COENZYMES
  - CARBON TETRACHLORIDE 99
- COPPER
  - WILSONS DISEASE 654*
- ELECTROLYTE
  - MALNUTRITION 862
- FATTY LIVER
  - ALCOHOL 162
- HORMONE
  - LIVER 150
- IRON
  - HEMOCHROMATOSIS 677
  - INFLAMMATION 33
  - LIVER 675
  - LIVER DISEASES 676
- LIPOPROTEINS
  - LIVER 669
- LIVER
  - ADENYLATE CYCLASE 154
  - ANILINE 178
  - CONTRAST MEDIA 156
  - TISSUE CULTURE 151
- LIVER DISEASE, ALCOHOLIC
  - EXPERIMENT 782*
- LIVER FUNCTION
  - HYPOTHERMIA 138*
- NUCLEIC ACIDS
  - LIVER 157
- PANCREAS
  - PROTEIN 130*
- PROTEIN
  - HEPATITIS, VIRAL 742
  - MALNUTRITION 862
- SMALL INTESTINE
  - CALCIUM 12
- SPECIES DIFFERENCES
  - DRUGS 25
- STEROID
  - LIVER 78
- SUGAR
  - GLUCAGON 321*
  - HORMONE CONTROL 321*
  - LIVER DISEASES 659
- TRIGLYCERIDE
  - ANOREXIGENIC AGENTS 142*
  - LIVER 142*
  - MALNUTRITION 862

METASTASES
- LIVER
  - NEOPLASMS, MALIGNANT 662
  - SURGERY 681

MICROSCOPY
- STOMACH
  - CIRCULATION 194

MITOCHONDRIA
- ANTIBODIES
  - HEPATITIS, CHRONIC 778
- LIVER
  - HEPATITIS, VIRAL 766

MITOSIS
- LIVER
  - MORPHOLOGY 667
- STOMACH
  - MUCOSA 311*
  - RADIATION 124

- MORPHOLOGY
  - ESOPHAGUS 293
    - DIAGNOSIS 253
  - GALLBALDDER
    - MUCOSA 6*
  - GASTROINTESTINAL TRACT
    - CHOLINESTERASE 15
  - HEPATITIS, VIRUS
    - CELLS 733
  - LIVER
    - LIVER DISEASES 685
    - MITOSIS 667
    - PIGMENTATION 676
    - TRANSPLANTATION 655*
  - MUCOSA
    - CHOLERA 455
  - NERVOUS SYSTEM
    - ESOPHAGUS 266*, 280
  - PANCREAS
    - MALNUTRITION 133
    - NERVOUS SYSTEM 9
    - REGENERATION 130*
  - PARENCHYMA
    - CIRRHOSIS 803
  - SMALL INTESTINE 14
    - CIRRHOSIS 808
    - VILLI 2*
  - STOMACH 293
    - ENDOCRINE SYSTEM 3*
    - ULCER 370*

- MOTILITY
  - BILIARY TRACT
    - CHOLECYSTOKININ 56
    - GASTRIN 56
    - HORMONE CONTROL 56
    - PENTAGASTRIN 75
    - SECRETIN 56
  - DUODENUM 52
    - ELECTROPHYSIOLOGY 65
    - PENTAGASTRIN 75
    - PEPTIC ULCER 51
  - ESOPHAGUS
    - ACHALASIA 280
    - NERVOUS CONTROL 267*, 275*
  - GASTROINTESTINAL
    - SURGERY 861
    - TECHNIQUES 212
  - INTESTINE
    - LACTOSE INTOLERANCE 514
  - JEJUNUM
    - PEPTIC ULCER 51
  - PANCREATIC DUCT
    - BILE 59
    - DRUG EFFECTS ON 59
  - PEPTIC ULCER
    - SURGERY 385
  - SMALL INTESTINE 69
    - ELECTRICAL CONTROL 63
    - ELECTROPHYSIOLOGY 60, 61
    - ION TRANSPORT 19*
    - NERVOUS CONTROL 55
    - ULTRASTRUCTURE 61
  - STOMACH 47*, 345
    - ACIDS 50*
    - ELECTRICAL CONTROL 62, 63
    - ELECTROPHYSIOLOGY 57, 60
    - ENDOTOXINS 334
    - PENTAGASTRIN 75
    - ULCER 369*
    - VAGOTOMY 76
  - ULCERATIVE COLITIS
    - DIETARY FACTORS 605
    - DRUG EFFECTS ON 605

- MUCOPOLYSACCHARIDE
  - NEOPLASMS, MALIGNANT
    - DIAGNOSIS 537*

- MUCOSA
  - ANUS
    - ANOMALY 594
  - ENTEROCOLITIS
    - CHRONIC 435*
  - GALLBALDDER
    - MORPHOLOGY 6*
  - INTESTINE
    - ASPIRIN 441
    - CHOLERA 455
    - CORTICOSTEROIDS 441
  - JEJUNUM
    - CHILDREN 432*
    - DERMATITIS HERPETIFORMIS 432*
    - ENZYMES 432*
  - MORPHOLOGY
    - CHOLERA 455
  - NEOPLASMS, MALIGNANT
    - COLON 454
    - RECTUM 537*
  - SMALL INTESTINE
    - ENZYMES 453
    - IMMUNOGLOBULIN 430*
    - RADIOTHERAPY 436
    - VIRUS 430*
  - STOMACH
    - ACID SECRETION 119
    - ALCOHOL 311*
    - ANTIINFLAMMATORY AGENTS 319*, 348
    - ATROPINE 86*
    - CAFFEINE 319*
    - CORTICOSTEROIDS 319*
    - DRUG EFFECTS ON 319*, 348
    - GASTRITIS 352
    - MITOSIS 311*

- MUCUS
  - STOMACH
    - SECRETION 351

- MURAMIDASE
  - GASTRECTOMY
    - PEPTIC ULCER 127
  - STOMACH
    - SECRETION 127

- MUSCULOSKELETAL SYSTEM
  - FATTY LIVER
    - DISEASES ASSOCIATED WITH 656*
  - GASTRECTOMY
    - SEQUELAE 332
  - HEPATITIS, NONVIRAL
    - DISEASES ASSOCIATED WITH 656*
  - HEPATITIS, VIRAL
    - DISEASES ASSOCIATED WITH 718*

- MYCOSIS
  - SEE FUNGUS DISEASE

- NECROSIS
  - PANCREAS
    - DRUG TREATMENT 625
    - ENZYMES 625
  - STOMACH
    - DRUG-INDUCED 364

- NEONATE
  - SEE ALSO AGE FACTORS, CHILDREN
  - CIRRHOSIS
    - FETOPROTEIN, ALPHA 799

    ENTERITIS
        EXPERIMENTAL 440
    ESOPHAGUS
        PERFORATION 305
    HEPATITIS, VIRAL
        ANTIGEN, AUSTRALIA 719*
        EPIDEMIOLOGY 728
    HEPATOSPLENOMEGALY
        IMMUNOGLOBULINS 665
    HYPERBILIRUBINEMIA
        TRANSFUSION 689*
    INTESTINE
        ULCER 597
    JAUNDICE 698
        PHOTOTHERAPY 695, 703
        TREATMENT 702
    PROTEIN
        ABSORPTION 485*

NEOPLASMS
    GASTROINTESTINAL
        IMMUNOLOGY 859
    LARGE INTESTINE
        CIRCULATION 876
    PANCREAS 632
        ANGIOGRAPHY 235
        DIAGNOSIS 235
        RADIOLOGY 236

NEOPLASMS, BENIGN
    BILE DUCT 817
    COLON 585
        FAMILIAL DISEASE 557, 565
        IMMUNOLOGY 536*
        LYMPHOCYTE 536*
    DUODENUM 340
        NERVOUS SYSTEM 318*
        VILLI 473
    ESOPHAGUS 289, 298
    JAUNDICE 817
    LIVER
        CHILDREN 666
    PANCREAS 631
    PERITONEUM 874
    RECTUM
        ELECTROLYTE 601
        FAMILIAL DISEASE 557
    STOMACH 340, 342
        DIAGNOSIS 207
        NERVOUS SYSTEM 318*
        POLYPS 335, 337

NEOPLASMS, MALIGNANT
    ANTIGEN, AUSTRALIA
        EPIDEMIOLOGY 753
        LIVER 753
    ANUS
        SURGERY 552
    COLON 534*
        CHEMOTHERAPY 582
        CONNECTIVE TISSUE 551
        DIETARY FACTORS 571
        EXPERIMENTAL 579, 596
        FISTULA 589
        IMMUNOGLOBULINS 539*, 558
        IMMUNOLOGY 532*, 536*, 578, 580
        IMMUNOTHERAPY 581
        SURGERY 552
    DIAGNOSIS
        MUCOPOLYSACCHARIDE 537*
    DUODENUM 446, 472
        NERVOUS SYSTEM 318*
    ESOPHAGITIS, REFLUX
        SEQUELAE 303
    ESOPHAGUS 279
        DIETARY FACTORS 306
        DISEASES ASSOCIATED WITH 847
        ETIOLOGY 306
        RADIOTHERAPY 291*, 308
        SURGERY 278, 302
    EXPERIMENTAL
        COLON 454
    FETOPROTEIN, ALPHA 816
    GALLBLADDER 816, 820, 828
    GASTROINTESTINAL
        AGE FACTORS 872
        CHEMOTHERAPY 888
        COENZYMES 343
        DIAGNOSIS 241, 343
        INFECTION 863
    HERNIA, HIATUS
        SEQUELAE 303
    JEJUNUM 466
    LARGE INTESTINE 847
        RADIOTHERAPY 584
        SURVIVAL 849
    LIVER
        CHILDREN 666
        DIAGNOSIS 217, 657*
        ENDOSCOPY 217
        ETIOLOGY 664
        FETOPROTEIN, ALPHA 657*
        HEPATECTOMY 679
        IMMUNOLOGY 668
        METASTASES 662
        SCANNING, SCINTILLATION 217
        SURGERY 652*
        SURVIVAL 679
    LYMPHATICS
        IMMUNOLOGY 596
        RADIOTHERAPY 549
    MUCOSA
        COLON 454
    MULTIPLE
        LARGE INTESTINE 542
    PANCREAS 630
        DIAGNOSIS 622, 626
        EPIDEMIOLOGY 627
        PANCREAS FUNCTION TESTS 227
    PERITONEUM 885
    RECTUM 534*, 560
        CONNECTIVE TISSUE 551
        IMMUNOLOGY 578
        MUCOSA 537*
        RADIOTHERAPY 547, 549
        SURGERY 552
    SIGMOID
        RADIOTHERAPY 547, 549
    SMALL INTESTINE
        ETHNIC FACTORS 849
        MALABSORPTION 849
        SURVIVAL 849
    STOMACH 324, 328, 359, 394, 847
        COMPLICATIONS 357
        DIAGNOSIS 221, 339, 350, 354,
        DISEASES ASSOCIATED WITH 329
        IMMUNOGLOBULINS 329
        NERVOUS SYSTEM 318*
        SEQUELAE 278
        SURGERY 326, 330
        SURVIVAL 849

NERVOUS CONTROL
    APPETITE 191
        SECRETION 105
    BILIARY TRACT 54
    ESOPHAGUS
        MOTILITY 267*, 275*

- PANCREAS
  - SECRETION 136
- SECRETION
  - NICOTINE 108
  - STOMACH 108
- SMALL INTESTINE
  - MOTILITY 55
- STOMACH 47*
  - BILE ACIDS 72
  - SECRETION 105

NERVOUS SYSTEM
- BILIARY TRACT
  - SURGERY 660
- DIARRHEA
  - DISEASES ASSOCIATED WITH 841
- DUODENUM
  - NEOPLASMS, BENIGN 318*
  - NEOPLASMS, MALIGNANT 318*
- HEPATITIS, SERUM
  - DISEASES ASSOCIATED WITH 732
- HIRSCHSPRUNGS DISEASE 531*
- LIVER
  - SURGERY 660
- MORPHOLOGY
  - ESOPHAGUS 266*, 280
- PANCREAS
  - MORPHOLOGY 9
  - SURGERY 660
- STOMACH
  - NEOPLASMS, BENIGN 318*
  - NEOPLASMS, MALIGNANT 318*
  - VAGOTOMY 336

NICOTINE
- SECRETION
  - NERVOUS CONTROL 108

NITRITE
- NUCLEIC ACIDS
  - SYNTHESIS 98
- PROTEIN
  - SYNTHESIS 98

NUCLEIC ACIDS
- LIVER
  - ULTRASTRUCTURE 158
- METABOLISM
  - LIVER 157
- STOMACH
  - RADIATION 124
- SYNTHESIS
  - AMINES 98
  - INHIBITION 98
  - NITRITE 98
  - SALIVARY GLANDS 81

OBSTRUCTION
- BILIARY TRACT
  - BILE ACIDS 141*, 811*
  - CIRCULATION 169
  - ELECTROLYTE 170
  - INFECTION, BACTERIA 818
  - SEQUELAE 818
- COLON
  - CHOLELITHIASIS 572
- ESOPHAGUS
  - DIAGNOSIS 268*
- INTESTINE 464
  - CYSTIC FIBROSIS 475
  - DRUG-INDUCED 408
- STOMACH 276

OBSTRUCTIVE JAUNDICE
- SEE JAUNDICE, OBSTRUCTIVE

OCCUPATIONAL FACTORS
- DUODENUM
  - ULCER 865
- PEPTIC ULCER 865
- STOMACH
  - ULCER 865

ORAL CONTRACEPTIVES
- LIVER FUNCTION TESTS
  - DRUG EFFECTS ON 675

PAIN
- PEPTIC ULCER
  - DRUG TREATMENT 424
- RECTUM
  - FAMILIAL DISEASE 555

PANCREAS
- ABERRATION
  - JAUNDICE, OBSTRUCTIVE 459
- ALCOHOL
  - SECRETION 129*
- AMYLASE
  - ANTIBIOTICS 128*
- ANOMALY
  - DISEASES ASSOCIATED WITH 346
- ATROPHY
  - ABSORPTION 20*
  - TRIGLYCERIDE 20*
- BICARBONATE
  - SECRETION 129*
- CHYMOTRYPSIN
  - SECRETION 129*
- CYSTIC FIBROSIS
  - VITAMIN A 628
  - VITAMIN E 628
- DIAGNOSIS
  - BIOPSY 239
  - ECHOGRAPHY 238, 250
  - ENDOSCOPY 239
  - RADIOLOGY 203, 215, 260
  - SCANNING, SCINTILLATION 205, 237
  - TECHNIQUES 621, 624
- ENZYMES
  - MALNUTRITION 133
- KWASHIORKOR
  - SIMULATION 133
- LIPASE
  - SECRETION 129*
- MORPHOLOGY
  - MALNUTRITION 133
  - NERVOUS SYSTEM 9
- NECROSIS
  - DRUG TREATMENT 625
  - ENZYMES 625
- NEOPLASMS 632
  - ANGIOGRAPHY 235
  - DIAGNOSIS 235
  - RADIOLOGY 236
- NEOPLASMS, BENIGN 631
- NEOPLASMS, MALIGNANT 630
  - DIAGNOSIS 622, 626
  - EPIDEMIOLOGY 627
  - PANCREAS FUNCTION TESTS 227
- PROTEIN
  - METABOLISM 130*
- PSEUDOCYST 623
  - TRAUMA 619
- REGENERATION
  - MORPHOLOGY 130*
- SECRETION
  - ALCOHOL 132*
  - ANTIBIOTICS 128*
  - CHOLECYSTOKININ 135

    - DRUG EFFECTS ON 135
    - ENZYMES 132*
    - GASTRIN 137
    - HORMONE 134
    - MALABSORPTION 500
    - NERVOUS CONTROL 136
    - SECRETIN 134
    - SJOGRENS SYNDROME 843
    - SMOKING 125
    - SURGERY 618*
  - SURGERY
    - NERVOUS SYSTEM 660
  - TRANSPLANTATION
    - REVIEWS 620
  - TRAUMA 456, 633
    - ANGIOGRAPHY 629

- PANCREAS FUNCTION TESTS
  - PANCREAS
    - NEOPLASMS, MALIGNANT 227
  - PANCREATITIS
    - DIAGNOSIS 227

- PANCREATIC DUCT
  - ANOMALIES
    - PANCREATITIS 649
  - DIAGNOSIS
    - RADIOLOGY 236
  - MOTILITY
    - BILE 59
    - DRUG EFFECTS ON 59
  - PERFORATION
    - PANCREATITIS 648

- PANCREATITIS
  - BLEEDING
    - TREATMENT 641
  - DIAGNOSIS 643, 646
    - PANCREAS FUNCTION TESTS 227
    - RADIOLOGY 236
    - TECHNIQUES 642
  - DISEASES ASSOCIATED WITH
    - CHOLANGITIS 636
    - DIABETES MELLITUS 644
    - JAUNDICE, OBSTRUCTIVE 647
    - RESPIRATORY SYSTEM 638
    - STENOSIS 647
  - DRUG TREATMENT
    - ANTIENZYMES 645
    - CORTICOSTEROIDS 637
  - ETIOLOGY
    - CALCULI 639
    - CHILDREN 640
  - HEALING
    - ENZYMES 635*
  - PANCREATIC DUCT
    - ANOMALIES 649
    - PERFORATION 648
  - PREGNANCY
    - DISEASES ASSOCIATED WITH 661
  - SERUM
    - AMYLASE 634*
    - ELECTROPHORESIS 634*
  - TREATMENT 643, 646

- PARASITES AND PARASITIC DISEASE
  - DIAGNOSIS
    - TECHNIQUES 905
  - DISEASES ASSOCIATED WITH
    - ANEMIA 894
  - EPIDEMIOLOGY 891, 902, 904, 906
    - DIARRHEA 900

- PARATHYROID GLAND
  - HEPATITIS, VIRAL
    - DISEASES ASSOCIATED WITH 760

- PARATYPHOID FEVER
  - SEE SALMONELLOSIS

- PARENCHYMA
  - MORPHOLOGY
    - CIRRHOSIS 803

- PARIETAL CELL
  - HISTAMINE 113
  - STOMACH
    - SURGERY 377*
  - ULTRASTRUCTURE
    - PENTAGASTRIN 1*

- PENTAGASTRIN
  - ACID SECRETION
    - IMMUNOSUPPRESSION 92*
  - BILIARY
    - SECRETION 137, 137
  - BILIARY TRACT
    - MOTILITY 75
  - DUODENUM
    - MOTILITY 75
  - PARIETAL CELL
    - ULTRASTRUCTURE 1*
  - STOMACH
    - ELECTROPHYSIOLOGY 66
    - MOTILITY 75
    - SECRETION 75, 112
    - ULTRASTRUCTURE 1*

- PEPSIN
  - DRUG EFFECTS ON 371*

- PEPTIC ULCER
  - SEE ALSO STOMACH ULCER, DUODENUM UL
  - ACID SECRETION
    - CONSTITUTIONAL FACTORS 417
    - DRUG EFFECTS ON 397
    - DRUG TREATMENT 395
    - SURGERY 423
  - DIAGNOSIS 428
    - ACID SECRETION 225, 229
    - ANGIOGRAPHY 405
    - ENDOSCOPY 207
    - RADIOLOGY 248
  - DISEASES ASSOCIATED WITH 225, 270,
    376*, 377*, 379, 384, 404
  - DRUG TREATMENT 290, 397, 415, 416
    - ANALGESICS 360
    - ANTISECRETORY AGENTS 375*
    - COMPLICATIONS 408
  - DUODENUM
    - MOTILITY 51
  - ENVIRONMENTAL FACTORS 427
  - EPIDEMIOLOGY 388
  - ETIOLOGY
    - ACID SECRETION 316*
    - ANOMALY 425
    - ENVIRONMENTAL FACTORS 376*
    - HYPOGLYCEMIA 384
    - SHOCK 405
  - GASTRECTOMY
    - MURAMIDASE 127
  - GASTRITIS
    - DISEASES ASSOCIATED WITH 316*
  - IMMUNOLOGY 379
  - JEJUNUM
    - MOTILITY 51

  OCCUPATIONAL FACTORS 865
  PAIN
    DRUG TREATMENT 424
  PERFORATION 418
    FISTULAS 864
    SURGERY 378
  PROTEIN
    DRUG TREATMENT 116
    SECRETION 116
  PSYCHOLOGICAL FACTORS 391, 392
  RECURRENCE 385, 386
  REVIEW 381
  REVIEWS 393
  STENOSIS
    PYLORUS 429
  STRESS 344
  SURGERY 345, 388
    ACID SECRETION 368*, 374*
    ADRENAL 323
    ANEMIA 380
    GASTRIN 320*
    GLUCAGON 321*
    MOTILITY 385
    SEQUELAE 322*, 327, 373*, 380,
      386, 389, 394, 421, 422
    SUGAR 321*
    SURVIVAL 382
    TECHNIQUES 387
  VAGOTOMY 383

ERFORATION
  ESOPHAGUS
    NEONATE 305
    TRAUMA 277, 309
  ILEUM
    POTASSIUM CHLORIDE 469
  PANCREATIC DUCT
    PANCREATITIS 648
  PEPTIC ULCER 418
    FISTULAS 864
    SURGERY 378
  STOMACH
    ULCER 399, 402
  ULCER
    DUODENUM 814

RFUSION
  LIVER
    ULTRASTRUCTURE 176
  SURVIVAL
    CIRRHOSIS 796*
    COMA, HEPATIC 796*

RISTALSIS
  DUODENUM 52
  LARGE INTESTINE
    ELECTROPHYSIOLOGY 64
  SMALL INTESTINE
    ELECTROPHYSIOLOGY 64

RITONEUM
  CIRCULATION
    IMMUNOLOGY 196
  NEOPLASMS, BENIGN 874
  NEOPLASMS, MALIGNANT 885
  TRAUMA
    COMPLICATIONS 867

RITONITIS
  DRUG TREATMENT
    ANTIBIOTICS 881
    CORTICOSTEROIDS 838*
  FOREIGN BODIES 838*
  SIMULATION
    FOREIGN BODIES 860
    THERAPY 837*
  SURGERY 838*
  THERAPY
    DIALYSIS 837*

PHOSPHATASE, ACID
  LIVER
    CIRCULATION 166

PHOSPHATASE, ALKALINE
  ISOENZYMES
    LIVER DISEASES 650*

PHOSPHOLIPID
  BRAIN
    LIVER DISEASE, ALCOHOLIC 786
  LIVER DISEASES
    TISSUE CULTURE 682
  SYNTHESIS
    LIVER 144*

PHOTOTHERAPY
  DIARRHEA
    SEQUELAE 695
  JAUNDICE
    NEONATAL 695
    NEONATE 703

PIGMENTATION
  LIVER
    MORPHOLOGY 676

PLASMA
  ANALYSIS
    ANTIGEN, AUSTRALIA 752

PLATELETS
  BILIRUBIN 688*

POLYPS
  GALLBLADDER 823
  STOMACH 325, 361
    NEOPLASMS, BENIGN 335, 337

PORTACAVAL SHUNT
  CIRRHOSIS 810
  LIVER DISEASE, ALCOHOLIC
    HEMOSIDEROSIS 781*

PORTAL HYPERTENSION
  CIRRHOSIS
    GENETICS 794*

PORTOGRAPHY
  CIRCULATION 193

POTASSIUM CHLORIDE
  ILEUM
    PERFORATION 469

PREGNANCY
  APPENDICITIS
    COMPLICATIONS 554
  BILE ACIDS
    COMPOSITION 139*
  COLON
    DILATATION 556
  FATTY LIVER
    DISEASES ASSOCIATED WITH 661
  HEARTBURN
    DRUG TREATMENT 296

- HEPATITIS, VIRAL
  - EPIDEMIOLOGY 768
- PANCREATITIS
  - DISEASES ASSOCIATED WITH 661
- PROTEIN-LOSING ENTEROPATHY
  - DISEASES ASSOCIATED WITH 661

PRESSURE STUDIES
- ACHALASIA 275*
  - DIAGNOSIS 199*
- ANUS 48*
- BILIARY TRACT 54
  - DIAGNOSIS 53
- CIRCULATION
  - INTESTINE 188
  - STOMACH 188
- DUODENUM 52
- ESOPHAGUS 48*
  - DIAGNOSIS 199*, 263*, 269*
  - DIETARY FACTORS 49*
  - GASTRIN 49*
- SMALL INTESTINE 51, 69
- STOMACH
  - TECHNIQUES 73
  - VAGOTOMY 76

PREVENTION
- CHOLELITHIASIS 148
- ENTEROCOLITIS 882
- HEPATITIS, SERUM 726, 727
- HEPATITIS, VIRAL 749
  - DIALYSIS 743
  - IMMUNOLOGY 724*
  - SERUM 231
  - TRANSMISSION 739
- ILEUS 861
- SCHISTOSOMIASIS 895

PROCTOCOLITIS
- RECTUM
  - CYTOLOGY 570
- SIGMOID
  - CYTOLOGY 570

PROSTAGLANDIN
- ACID SECRETION
  - STOMACH 82*
- CIRCULATION
  - STOMACH 82*, 190*

PROTEIN
- ABSORPTION
  - BACTERIA 485*
  - NEONATE 485*
  - STARVATION 485*
- DRUG TREATMENT
  - PEPTIC ULCER 116
- LIVER
  - INJURY 146
  - ULTRASTRUCTURE 8*
- LYMPHATICS
  - CIRRHOSIS 797*
- METABOLISM
  - HEPATITIS, VIRAL 742
  - MALNUTRITION 862
- PANCREAS
  - METABOLISM 130*
- SECRETION
  - PEPTIC ULCER 116
  - STOMACH 116
- SMALL INTESTINE
  - COMPOSITION 12
  - SECRETION 181*
  - SYNTHESIS 181*
- SYNTHESIS
  - AMINES 98
  - INHIBITION 98
  - NITRITE 98

PROTEIN-LOSING ENTEROPATHY
- PREGNANCY
  - DISEASES ASSOCIATED WITH 661

PROTHROMBIN
- DEFICIENCY
  - VITAMIN K 670
- HEPATITIS 670

PSEUDOCYST
- PANCREAS 623
  - TRAUMA 619

PSORIASIS
- STOMACH
  - ACID SECRETION 367

PSYCHOLOGICAL FACTORS
- PEPTIC ULCER 391, 392
- ULCERATIVE COLITIS 613

PYLOROPLASTY
- DUODENUM
  - DIVERTICULUM 438

PYLORUS
- SEE ALSO STOMACH
- DIAGNOSIS
  - TECHNIQUES 254
- HORMONE CONTROL 58
- STENOSIS
  - DIAGNOSIS 202
  - PEPTIC ULCER 429
  - RADIOLOGY 202

RADIATION
- COMPLICATIONS
  - LARGE INTESTINE 550
- GASTROINTESTINAL
  - INJURY 853
- LIVER
  - ENZYMES 153
- STOMACH
  - MITOSIS 124
  - NUCLEIC ACIDS 124

RADIOLOGY
- APPENDICITIS
  - ACUTE 600
- BILIARY TRACT
  - DIAGNOSIS 203, 215
- CROHNS DISEASE
  - DIAGNOSIS 481
- DUODENUM
  - TECHNIQUES 347
- DYSPHAGIA
  - DIAGNOSIS 269*
- ESOPHAGUS
  - DIAGNOSIS 264*
  - VARICES 218
- GALLBLADDER 830
  - DIAGNOSIS 18*, 245
- JAUNDICE
  - DIAGNOSIS 224
- JAUNDICE, OBSTRUCTIVE
  - DIAGNOSIS 209
- LARGE INTESTINE
  - DIAGNOSIS 206

- PANCREAS
  - DIAGNOSIS 203, 215, 260
  - NEOPLASMS 236
- PANCREATIC DUCT
  - DIAGNOSIS 236
- PANCREATITIS
  - DIAGNOSIS 236
- PEPTIC ULCER
  - DIAGNOSIS 248
- PYLORUS
  - STENOSIS 202
- SMALL INTESTINE 69
- STOMACH
  - DIAGNOSIS 201, 339
  - TECHNIQUES 202, 347
  - VARICES 201
- ULCERATIVE COLITIS
  - DIAGNOSIS 247

RADIOTELEMETRY
- GASTROINTESTINAL
  - DIAGNOSIS 257

RADIOTHERAPY
- ESOPHAGUS
  - NEOPLASMS, MALIGNANT 291*, 308
- NEOPLASMS, MALIGNANT
  - LARGE INTESTINE 584
  - LYMPHATICS 549
  - RECTUM 547, 549
  - SIGMOID 547, 549
- SMALL INTESTINE
  - MUCOSA 436
- ULCERATIVE COLITIS 615

ECTUM
- SEE ALSO LARGE INTESTINE
- ANOMALY, CONGENITAL
  - DIAGNOSIS 595
- DIAGNOSIS
  - CYTOLOGY 570
- DIVERTICULUM
  - CYTOLOGY 570
- GRANULOMA
  - BARIUM 545
- INFLAMMATION
  - SJOGRENS SYNDROME 843
- NEOPLASMS, BENIGN
  - ELECTROLYTE 601
  - FAMILIAL DISEASE 557
- NEOPLASMS, MALIGNANT 534*, 560
  - CONNECTIVE TISSUE 551
  - IMMUNOLOGY 578
  - MUCOSA 537*
  - RADIOTHERAPY 547, 549
  - SURGERY 552
- PAIN
  - FAMILIAL DISEASE 555
- PROCTOCOLITIS
  - CYTOLOGY 570
- SURGERY 590
  - CROHNS DISEASE 610
  - ULCERATIVE COLITIS 610
- VILLI
  - ELECTROLYTE 601

ECURRENCE
- DUODENUM
  - ULCER 373*
- PEPTIC ULCER 385, 386
- ULCER
  - STOMACH 413

REFLUX
- ESOPHAGUS
  - DIAGNOSIS 252, 263*

REGENERATION
- LIVER 149*
  - ULTRASTRUCTURE 176
  - VITAMIN B12 96
- PANCREAS
  - MORPHOLOGY 130*

REGIONAL ENTERITIS
- SEE ALSO ENTERITIS

RESPIRATORY SYSTEM
- PANCREATITIS
  - DISEASES ASSOCIATED WITH 638

RETROPERITONEAL
- FIBROSIS
  - CORTICOSTEROIDS 854
  - DRUGS 886

REVIEWS
- APPENDICITIS
  - ACUTE 573
- BILE SALTS
  - METABOLISM 523
- CELIAC DISEASE 530
  - DIAGNOSIS 518
  - TREATMENT 518
- CROHNS DISEASE 481
- ESOPHAGUS
  - RUPTURE 287
- GASTROINTESTINAL
  - TRYPANOSOMIASIS 893
- HEMATOMA
  - DUODENUM 465
- HIRSCHSPRUNGS DISEASE 541
- HORMONE
  - VASOPRESSIN 195
- LIVER DISEASE, ALCOHOLIC 784
- MALABSORPTION
  - CARBOHYDRATE 513
  - ETIOLOGY 503
- PANCREAS
  - TRANSPLANTATION 620
- PEPTIC ULCER 381, 393
- SPRUE, TROPICAL
  - ETIOLOGY 510
- STEATORRHEA
  - ETIOLOGY 515
- ULCER
  - STOMACH 412

REYES SYNDROME
- LIVER FUNCTION TESTS 651*

RUPTURE
- COLON
  - ACCIDENT 562
- DUODENUM 448
- ESOPHAGUS
  - ETIOLOGY 272
  - REVIEW 287

SALIVARY GLANDS
- CIRRHOSIS 806
- NUCLEIC ACIDS
  - SYNTHESIS 81
- SECRETION
  - ACETYLCHOLINE 79
  - CALCIUM 79

SALMONELLOSIS
    EPIDEMIOLOGY 891

SCANNING, SCINTILLATION
    HODGKINS DISEASE
        LIVER 198*
    LIVER
        COMPLICATIONS 246
        DIAGNOSIS 226
        NEOPLASMS, MALIGNANT 217
    PANCREAS
        DIAGNOSIS 205, 237

SCHISTOSOMIASIS
    EPIDEMIOLOGY 895, 903
    IMMUNOLOGY 896
    PREVENTION 895

SCLERODERMA
    MALABSORPTION
        ETIOLOGY 524

SECRETIN
    BILIARY TRACT
        MOTILITY 56
    HORMONE
        INTESTINE 77
    PANCREAS
        SECRETION 134
    SMALL INTESTINE
        TRANSPORT 31*

SECRETION
    APPETITE
        NERVOUS CONTROL 105
    BILE
        ANOREXIGENIC AGENTS 142*
        ANTIBIOTICS 177
        CONTRAST MEDIA 830
        DRUGS 25
        THYROID 94
    BILIARY
        GASTRIN 137
        PENTAGASTRIN 137
    BILIARY TRACT 54
        DIAGNOSIS 53
    DUODENUM
        HEPARIN 126
    ELECTROLYTE 170
    GASTRIN
        CATECHOLAMINES 118
        CIRCADIAN RHYTHM 90*
        FASTING 120
    INTRINSIC FACTOR
        AGE FACTORS 103
    LIVER
        CONTRAST MEDIA 156
        DRUG EFFECTS ON 746
    NICOTINE
        NERVOUS CONTROL 108
    PANCREAS
        ALCOHOL 129*, 132*,
        ANTIBIOTICS 128*
        BICARBONATE 129*
        CHOLECYSTOKININ 135
        CHYMOTRYPSIN 129*
        DRUG EFFECTS ON 135
        ENZYMES 132*
        GASTRIN 137
        HORMONE 134
        LIPASE 129*
        MALABSORPTION 500
        NERVOUS CONTROL 136
        SECRETIN 134
        SJOGRENS SYNDROME 843
        SMOKING 125
        SURGERY 618*
    PROTEIN
        PEPTIC ULCER 116
        STOMACH 116
    SALIVARY GLAND
        ACETYLCHOLINE 79
        CALCIUM 79
    SMALL INTESTINE
        IMMUNOGLOBULIN 181*
        PROTEIN 181*
    STOMACH
        ANESTHESIA 91*
        BILE 106
        CHEMICAL COMPOSITION 121
        CHOLECYSTOKININ 112
        DIAGNOSIS 102
        DRUG EFFECTS ON 122
        ELECTROLYTE 220
        HEIDENHAIN POUCH 123
        HEPARIN 126
        HISTAMINE 91*
        HORMONE 109, 111
        HORMONE CONTROL 320*
        HYPOXIA 111
        MUCUS 351
        MURAMIDASE 127
        NERVOUS CONTROL 105, 108
        PENTAGASTRIN 75, 112
        SMOKING 117, 125
        STRESS 315*
        TRIGLYCERIDES 106
        ULCER 369*
        VAGOTOMY 414

SEROTONIN
    SMALL INTESTINE
        ELECTROPHYSIOLOGY 71

SERUM
    AMYLASE
        ANALYSIS 131*
        PANCREATITIS 634*
    ELECTROPHORESIS
        PANCREATITIS 634*
    HEPATITIS, VIRAL
        PREVENTION 231
    HYPERBILIRUBINEMIA
        ALBUMIN 701
    IRON
        KWASHIORKOR 520

SHOCK
    LIVER
        CIRCULATION 165
    PEPTIC ULCER
        ETIOLOGY 405
    SMALL INTESTINE
        ISCHEMIA 445

SHORT BOWEL SYNDROME
    TREATMENT
        TRIGLYCERIDE 499

SHUNT
    CIRRHOSIS
        SURVIVAL 795*

SIGMOID
    SEE ALSO LARGE INTESTINE
    DIAGNOSIS
        CYTOLOGY 570
    NEOPLASMS, MALIGNANT
        RADIOTHERAPY 547, 549

- PROCTOCOLITIS
  - CYTOLOGY 570
- STENOSIS 559
- ULCERATIVE COLITIS 616

IMULATION
- KWASHIORKOR
  - PANCREAS 133
- PERITONITIS
  - FOREIGN BODIES 860
  - THERAPY 837*

JOGRENS SYNDROME
- ACHLORHYDRIA
  - DISEASES ASSOCIATED WITH 292
- ESOPHAGITIS, REFLUX
  - DISEASES ASSOCIATED WITH 292
- GASTRITIS
  - DISEASES ASSOCIATED WITH 292
- JEJUNUM
  - INFLAMMATION 843
- PANCREAS
  - SECRETION 843
- RECTUM
  - INFLAMMATION 843

ALL INTESTINE
- SEE ALSO DUODENUM, JEJUNUM, ILEUM
- SEE ALSO INTESTINE
- ABSORPTION
  - CALCIUM 39*, 180*
  - CONTRAST MEDIA 18*
  - FATTY ACIDS 24*
  - FOLIC ACID 21*, 44
  - LIPIDS 41*
  - VITAMIN D 180*
- ACIDITY
  - ABSORPTION 22*
  - ION TRANSPORT 22*
- CALCIUM
  - ABSORPTION 43
  - METABOLISM 12
- CIRCULATION
  - HYPOTENSION 189
- COMPOSITION
  - KIDNEY DISEASE 12
  - PROTEIN 12
- DIAGNOSIS
  - BIOPSY 214, 242
  - ENDOSCOPY 203
- DISACCHARIDASE
  - DIABETES MELLITUS 7*
- DIVERTICULUM
  - BACTERIA 437
- ELECTROPHYSIOLOGY 69
  - HORMONE EFFECTS ON 71
  - SEROTONIN 71
- HEMATOMA
  - DRUG-INDUCED 451
- HYPERTROPHY
  - CIRCULATION 444
- INDUCTION
  - ENZYMES 185
- INFECTION
  - VIRUS 453
- INTRINSIC FACTOR
  - ABSORPTION 38*
- ION TRANSPORT
  - BILE ACIDS 23*
  - DIURETICS 32
  - DRUG EFFECTS ON 32
  - MOTILITY 19*
- IRON
  - ABSORPTION 17*, 33
- ISCHEMIA 447
  - SHOCK 445
- LYMPHATICS
  - DISEASES ASSOCIATED WITH 458
- MORPHOLOGY 14
  - CIRRHOSIS 808
  - VILLI 2*
- MOTILITY 69
  - ELECTRICAL CONTROL 63
  - ELECTROPHYSIOLOGY 60, 61
  - NERVOUS CONTROL 55
  - ULTRASTRUCTURE 61
- MUCOSA
  - ENZYMES 453
  - IMMUNOGLOBULIN 430*
  - RADIOTHERAPY 436
  - VIRUS 430*
- NEOPLASMS, MALIGNANT
  - ETHNIC FACTORS 849
  - MALABSORPTION 849
  - SURVIVAL 849
- PERISTALSIS
  - ELECTROPHYSIOLOGY 64
- PRESSURE STUDIES 51, 69
- RADIOLOGY 69
- SECRETION
  - IMMUNOGLOBULIN 181*
  - PROTEIN 181*
- SODIUM
  - TRANSPORT 27
- STASIS SYNDROME
  - STEATORRHEA 433*
- SURGERY
  - CHOLESTEROL 443
  - DISEASES ASSOCIATED WITH 443
- SYNTHESIS
  - PROTEIN 181*
- TRANSPLANTATION 186
- TRANSPORT
  - CALCIUM 26*
  - GLUCAGON 31*
  - HORMONE CONTROL 31*
  - SECRETIN 31*
  - SODIUM 30
  - SUGAR 40*
- ULTRASTRUCTURE
  - ALCOHOL 5*
- VOLVULUS
  - DISEASES ASSOCIATED WITH 496

SMOKING
- PANCREAS
  - SECRETION 125
- STOMACH
  - SECRETION 117, 125

SODIUM
- TRANSPORT
  - CORTICOSTEROIDS 27
  - ENDOCRINE SYSTEM 27
  - ENVIRONMENTAL FACTORS 27
  - GLUCOSE 30
  - SMALL INTESTINE 27, 30

SPECIES DIFFERENCES
- DRUGS
  - ABSORPTION 25
  - METABOLISM 25

SPHINCTER
- ANORECTUM
  - STIMULATION 591
- ESOPHAGUS
  - HORMONE CONTROL 58

SPRUE, TROPICAL
    ETIOLOGY
        REVIEWS 510

STARVATION
    LIVER
        GLYCOGEN 173
    PROTEIN
        ABSORPTION 485*

STASIS SYNDROME
    SMALL INTESTINE
        STEATORRHEA 433*

STEATORRHEA
    CELLS
        DYSFUNCTION 433*
    ETIOLOGY
        LACTASE DEFICIENCY 501
        REVIEWS 515
    SMALL INTESTINE
        STASIS SYNDROME 433*

STEATOSIS
    SEE FATTY LIVER

STENOSIS
    DUODENUM 463
    ESOPHAGUS
        SURGERY 285, 301
    PANCREATITIS
        DISEASES ASSOCIATED WITH 647
    PYLORUS
        DIAGNOSIS 202
        PEPTIC ULCER 429
        RADIOLOGY 202
    SIGMOID 559

STEROID
    EXCRETION
        BILE 78
    METABOLISM
        LIVER 78

STIMULATION
    ANORECTUM
        SPHINCTER 591

STOMACH
    SEE ALSO ANTRUM, PYLORUS
    ABSORPTION
        DRUGS 42
    ACID SECRETION 114, 229
        ADRENERGIC BLOCKING AGENTS 104
        ALCOHOL 107
        ATROPINE 86*
        CALCIUM 338
        CARBONIC ANHYDRASE INHIBITORS 101
        CHOLINERGIC AGENTS 88*
        CORTICOSTEROIDS 87*
        DIURETICS 101
        DRUG EFFECTS ON 395
        FISTULA 92*
        GASTRIN 110
        HORMONE 88*
        HORMONE CONTROL 404
        PSORIASIS 367
        ULCER 400
    BLEEDING
        DRUG TREATMENT 314*
        ENDOSCOPY 240
        VASOCONSTRICTORS 314*
    CARCINOIDS 325
    CHOLINERGIC AGENTS
        ACID SECRETION 83*
    CIRCULATION
        ANTIINFLAMMATORY AGENTS 115
        ENDOSCOPY 115
        MANOMETRY 188
        MICROSCOPY 194
        PROSTAGLANDINS 190*
    COMPLICATIONS
        HERNIA, HIATUS 276
    DIAGNOSIS 220
        ACID SECRETION 232, 251
        AUTORADIOGRAPHY 216
        BIOPSY 216
        COMPLICATIONS 341
        ENDOSCOPY 207, 244, 258
        GASTRITIS 341
        RADIOLOGY 201, 339
    DILATATION 333
    DISEASES ASSOCIATED WITH
        ULCER 398
    DIVERTICULUM
        DISEASES ASSOCIATED WITH 356
    ELECTROLYTE
        SECRETION 220
    ELECTROPHYSIOLOGY 67
        DIETARY FACTORS 66
        PENTAGASTRIN 66
        VAGOTOMY 76
        WATER 66
    FOREIGN BODIES
        THERAPY 362
    INHIBITION
        TRIGLYCERIDES 106
    MITOSIS
        RADIATION 124
    MORPHOLOGY 293
        ENDOCRINE SYSTEM 3*
    MOTILITY 47*, 345
        ACIDS 50*
        ELECTRICAL CONTROL 62, 63
        ELECTROPHYSIOLOGY 57, 60
        ENDOTOXINS 334
        PENTAGASTRIN 75
        VAGOTOMY 76
    MUCOSA
        ACID SECRETION 119
        ALCOHOL 311*
        ANTIINFLAMMATORY AGENTS 319*,
        ATROPINE 86*
        CAFFEINE 319*
        CORTICOSTEROIDS 319*
        DRUG EFFECTS ON 319*, 348
        GASTRITIS 352
        MITOSIS 311*
    NECROSIS
        DRUG-INDUCED 364
    NEOPLASMS, BENIGN 340, 342
        DIAGNOSIS 207
        NERVOUS SYSTEM 318*
        POLYPS 335, 337
    NEOPLASMS, MALIGNANT 324, 328, 35
      394, 847
        COMPLICATIONS 357
        DIAGNOSIS 221, 339, 350, 354,
        DISEASES ASSOCIATED WITH 329
        IMMUNOGLOBULINS 329
        NERVOUS SYSTEM 318*
        SEQUELAE 278
        SURGERY 326, 330
        SURVIVAL 849
    NERVOUS CONTROL 47*
        BILE ACIDS 72

- NERVOUS SYSTEM
  - VAGOTOMY 336
- NUCLEIC ACIDS
  - RADIATION 124
- OBSTRUCTION 276
- POLYPS 325, 361
- PRESSURE STUDIES
  - TECHNIQUES 73
  - VAGOTOMY 76
- PROSTAGLANDIN
  - ACID SECRETION 82*
  - CIRCULATION 82*
- PROTEIN
  - SECRETION 116
- RADIOLOGY
  - TECHNIQUES 347
- SECRETION
  - ANESTHESIA 91*
  - BILE 106
  - CHEMICAL COMPOSITION 121
  - CHOLECYSTOKININ 112
  - DIAGNOSIS 102
  - DRUG EFFECTS ON 122
  - HEIDENHAIN POUCH 123
  - HEPARIN 126
  - HISTAMINE 91*
  - HORMONE 109, 111
  - HORMONE CONTROL 320*
  - HYPOXIA 111
  - MUCUS 351
  - MURAMIDASE 127
  - NERVOUS CONTROL 105, 108
  - PENTAGASTRIN 75, 112
  - SMOKING 117, 125
  - STRESS 315*
  - TRIGLYCERIDES 106
  - VAGOTOMY 414
- SURGERY
  - COMPLICATIONS 330
  - DISEASES ASSOCIATED WITH 313*
  - GASTRITIS 331
  - PARIETAL CELL 377*
  - SEQUELAE 279, 313*, 331
  - TRAUMA 358
- TECHNIQUES
  - RADIOLOGY 202
- TUBERCULOSIS
  - GASTRITIS 353
- ULCER 401
- SEE ALSO PEPTIC ULCER
  - DISEASES ASSOCIATED WITH 370*
  - DRUG TREATMENT 420
  - MORPHOLOGY 370*
  - MOTILITY 369*
  - OCCUPATIONAL FACTORS 865
  - PERFORATION 399, 402
  - RECURRENCE 413
  - REVIEWS 412
  - SECRETION 369*
  - SIMULATION 369*, 406
  - SURGERY 387
  - TREATMENT 409
- ULTRASTRUCTURE
  - ENDOCRINE SYSTEM 10
  - PENTAGASTRIN 1*
- VARICES
  - RADIOLOGY 201
- VOLVULUS 276

RANGULATION
- APPENDIX
  - HERNIA 561

STRESS
- GASTROINTESTINAL
  - BLEEDING 315*
- GLUCOSE TOLERANCE TEST 28
- PEPTIC ULCER 344
- STOMACH
  - SECRETION 315*

STRICTURE
- BILE DUCT 814
- ESOPHAGUS
  - DILATATION 284, 295
  - DISEASES ASSOCIATED WITH 295
  - SURGERY 295

STRONTIUM
- ABSORPTION
  - AGE FACTORS 46

SUCROSE
- MALABSORPTION
  - EPIDEMIOLOGY 504, 522
  - LACTASE DEFICIENCY 504, 522

SUGAR
- ABSORPTION
  - DRUG EFFECTS ON 36
  - LARGE INTESTINE 36
- INDUCTION
  - ENZYMES 185
- INTESTINE
  - TRANSPORT 35
- METABOLISM
  - GLUCAGON 321*
  - HORMONE CONTROL 321*
  - LIVER DISEASES 659
- PEPTIC ULCER
  - SURGERY 321*
- SMALL INTESTINE
  - TRANSPORT 40*

SURGERY
- ACHALASIA 274, 282*
- ACID SECRETION
  - PEPTIC ULCER 423
- BILIARY TRACT 824
  - COMPLICATIONS 836
  - NERVOUS SYSTEM 660
  - TECHNIQUE 819
  - TRAUMA 836
- COLON
  - ANOMALY 461
  - FISTULA 450
- CROHNS DISEASE 478
- DIVERTICULUM, ZENKERS 304
- DUODENUM
  - FISTULA 449, 450
  - ULCER 326, 372*, 373*
- ESOPHAGITIS, REFLUX 271, 285
- ESOPHAGUS 286
  - BLEEDING 297
  - NEOPLASMS, MALIGNANT 278, 302
  - STENOSIS 285, 301
  - STRICTURE 295
  - TRAUMA 358
  - VARICES 283, 297, 307
- GALLBLADDER
  - SEQUELAE 822
- GASTRITIS, REFLUX 331
- GASTROINTESTINAL
  - ANTISPASMODICS 873
  - BLEEDING 317*

    - MOTILITY 861
  - HERNIA, HIATUS 293
    - CHILDREN 265*
    - SEQUELAE 265*
  - ILEUM
    - ANOMALY 461
  - INTESTINE
    - ADHESIONS 471
  - LIVER
    - ECHINOCOCCOSIS 907
    - METASTASES 681
    - NEOPLASMS, MALIGNANT 652*
    - NERVOUS SYSTEM 660
    - TRAUMA 674
  - MECKELS DIVERTICULUM 877
  - MEGAESOPHAGUS 282*
  - NEOPLASMS, MALIGNANT
    - ANUS 552
    - COLON 552
    - RECTUM 552
  - PANCREAS
    - NERVOUS SYSTEM 660
    - SECRETION 618*
  - PEPTIC ULCER 345, 388
    - ACID SECRETION 368*, 374*
    - ADRENAL 323
    - ANEMIA 380
    - GASTRIN 320*
    - GLUCAGON 321*
    - MOTILITY 385
    - PERFORATION 378
    - SEQUELAE 322*, 327, 373*, 380, 386, 389, 394, 421, 422
    - SUGAR 321*
    - SURVIVAL 382
    - TECHNIQUES 387
  - PERITONITIS 838*
  - RECTUM 590
    - CROHNS DISEASE 610
    - ULCERATIVE COLITIS 610
  - SEQUELAE
    - CHOLECYSTITIS 813
    - HERNIA 563
  - SMALL INTESTINE
    - CHOLESTEROL 443
    - DISEASES ASSOCIATED WITH 443
  - STOMACH
    - COMPLICATIONS 330
    - DISEASES ASSOCIATED WITH 313*
    - GASTRITIS 331
    - NEOPLASMS, MALIGNANT 326, 330
    - PARIETAL CELL 377*
    - SEQUELAE 279, 313*, 331
    - TRAUMA 358
    - ULCER 387
  - TECHNIQUES
    - ANTRECTOMY 365
  - ULCER
    - DUODENUM 396
    - VAGOTOMY 407

- SURVIVAL
  - APPENDICITIS
    - ACUTE 593
  - ENTERECTOMY 868
  - LARGE INTESTINE
    - NEOPLASMS, MALIGNANT 849
  - LIVER
    - NEOPLASMS, MALIGNANT 679
  - PEPTIC ULCER
    - SURGERY 382
  - PERFUSION
    - CIRRHOSIS 796*
    - COMA, HEPATIC 796*
  - SHUNT
    - CIRRHOSIS 795*
  - SMALL INTESTINE
    - NEOPLASMS, MALIGNANT 849
  - STOMACH
    - NEOPLASMS, MALIGNANT 849

- SYNTHESIS
  - FETOPROTEIN, ALPHA
    - GASTROINTESTINAL TRACT 174
    - LIVER 174
  - LIVER
    - AMINO ACID 160
    - LIPID 159
  - NUCLEIC ACIDS
    - SALIVARY GLANDS 81
  - SMALL INTESTINE
    - PROTEIN 181*

- TELANGIECTASIA
  - CIRRHOSIS
    - GENETICS 794*

- THERAPY
  - ACHALASIA 274
  - CHOLELITHIASIS 831
  - ENZYMES
    - LIVER DISEASES 683
  - ESOPHAGUS
    - ATRESIA 310
  - HEPATITIS
    - CORTICOSTEROIDS 168
  - PERITONITIS
    - DIALYSIS 837*
    - SIMULATION 837*
  - STOMACH
    - FOREIGN BODIES 362

- THROMBOSIS
  - MESENTERY
    - DISEASES ASSOCIATED WITH 840

- THYROID
  - BILE
    - DISEASE 94
    - ENZYMES 94
    - SECRETION 94
  - LIVER
    - ENZYMES 680

- TISSUE CULTURE
  - LIVER
    - ENZYME 172
    - GROWTH 93
    - GROWTH FACTOR 149*
    - METABOLISM 151
    - TECHNIQUES 151
  - LIVER DISEASES
    - PHOSPHOLIPID 682

- TOXICITY
  - ENDOTOXIN
    - DRUG EFFECTS ON 37*

- TOXIN
  - DYSENTERY
    - CIRRHOSIS 100

- TRACER STUDY
  - CALCIUM
    - ABSORPTION 43

- TRANQUILIZERS
  - GASTROINTESTINAL
    - DRUG TREATMENT 852

- HEPATITIS, NONVIRAL
  - DRUG-INDUCED 704*

- TRANSFUSION
  - COMPLICATIONS
    - ENTEROCOLITIS 882
  - HYPERBILIRUBINEMIA
    - NEONATE 689*

- TRANSKETOLASE
  - LIVER
    - ENZYME 175

- TRANSMISSION
  - HEPATITIS, VIRAL
    - PREVENTION 739

- TRANSPLANTATION
  - LIVER
    - IMMUNOLOGY 167, 655*
    - MORPHOLOGY 655*
  - PANCREAS
    - REVIEWS 620
  - SMALL INTESTINE 186

- TRANSPORT
  - AMINO ACIDS
    - DIETARY FACTORS 45
    - VITAMIN A 45
  - CALCIUM
    - SMALL INTESTINE 26*
    - VITAMIN D 26*
  - ELECTROLYTE
    - ENTERITIS 440
  - INTESTINE
    - AMINO ACID 35
    - CALCIUM 34
    - SUGAR 35
    - TECHNIQUE 29
  - SMALL INTESTINE
    - GLUCAGON 31*
    - HORMONE CONTROL 31*
    - SECRETIN 31*
    - SUGAR 40*
  - SODIUM
    - CORTICOSTEROIDS 27
    - ENDOCRINE SYSTEM 27
    - ENVIRONMENTAL FACTORS 27
    - GLUCOSE 30
    - SMALL INTESTINE 27, 30
  - VITAMIN D
    - CALCIUM 34

- RAUMA
  - BILIARY TRACT
    - SURGERY 836
  - DUODENUM 456
  - ESOPHAGUS
    - PERFORATION 277, 309
    - SURGERY 358
  - EXPERIMENTAL
    - COLON 535*
  - GASTRECTOMY
    - DUODENUM 474
    - SEQUELAE 474
  - HEMATOMA
    - DUODENUM 465
  - INTESTINE
    - INFARCTION 470
  - LIVER
    - COMPLICATIONS 674
    - DIAGNOSIS 262
    - SURGERY 674
  - MESENTERY
    - COMPLICATIONS 867
  - PANCREAS 456, 633
    - ANGIOGRAPHY 629
    - PSEUDOCYST 619
  - PERITONEUM
    - COMPLICATIONS 867
  - STOMACH
    - SURGERY 358

- TREATMENT
  - BLEEDING
    - GASTROINTESTINAL 748
  - CELIAC DISEASE
    - REVIEWS 518
  - DYSPEPSIA
    - VAGOTOMY 419
  - HEPATITIS, VIRAL
    - DIALYSIS 716*
  - JAUNDICE
    - NEONATE 702
  - LIVER
    - COMA 748
  - PANCREATITIS 643, 646
    - BLEEDING 641
  - SHORT BOWEL SYNDROME
    - TRIGLYCERIDE 499
  - ULCER
    - STOMACH 409

- TRIGLYCERIDE
  - INHIBITION
    - STOMACH 106
  - METABOLISM
    - ANOREXIGENIC AGENTS 142*
    - LIVER 142*
    - MALNUTRITION 862
  - PANCREAS
    - ATROPHY 20*
  - SECRETION
    - STOMACH 106
  - SHORT BOWEL SYNDROME
    - TREATMENT 499
  - SYNTHESIS
    - LIVER 144*

- TROPICAL SPRUE
  - MALABSORPTION
    - ETIOLOGY 517

- TRYPANOSOMIASIS
  - GASTROINTESTINAL
    - DISEASES 857
    - REVIEWS 893

- TUBERCULOSIS
  - STOMACH
    - GASTRITIS 353

- TYPHOID
  - INTESTINE
    - BLEEDING 467

- ULCER
  - ACID SECRETION
    - STOMACH 400
  - DISEASES ASSOCIATED WITH
    - DUODENUM 398
    - STOMACH 398
  - DUODENUM
    - CONSTITUTIONAL FACTORS 426
    - DIAGNOSIS 248
    - DRUG TREATMENT 371*

    GASTRIN 320*
    OCCUPATIONAL FACTORS 865
    PERFORATION 814
    RECURRENCE 373*
    SEQUELAE 403
    SURGERY 326, 372*, 373*, 396
    VAGOTOMY 390
  INTESTINE
    NEONATE 597
  STOMACH 401
    DISEASES ASSOCIATED WITH 370*
    DRUG TREATMENT 420
    MORPHOLOGY 370*
    MOTILITY 369*
    OCCUPATIONAL FACTORS 865
    PERFORATION 399, 402
    RECURRENCE 413
    REVIEWS 412
    SECRETION 369*
    SIMULATION 369*, 406
    SURGERY 387
    TREATMENT 409
  VAGOTOMY
    SURGERY 407

ULCERATIVE COLITIS
  SEE ALSO COLITIS
  AMEBIASIS
    DIAGNOSIS 617
  ANTIBODIES 602*
    LIVER 608
  COLON
    CROHNS DISEASE 609
  COMPLICATIONS 604
  CROHNS DISEASE
    LARGE INTESTINE 611
  DIAGNOSIS
    IMMUNOLOGY 858
    RADIOLOGY 247
  DISEASES ASSOCIATED WITH
    HYPERTENSION 606
  DRUG TREATMENT 483, 603*, 607
  ETIOLOGY 604
  INTESTINE
    EPITHELIUM 434*
  MEGACOLON 612
  MOTILITY
    DIETARY FACTORS 605
    DRUG EFFECTS ON 605
  PSYCHOLOGICAL FACTORS 613
  RADIOTHERAPY 615
  RECTUM
    SURGERY 610
  SIGMOID 616

ULTRASTRUCTURE
  ANTRUM
    GASTRIN 4*
  LIVER 11, 13
    DIET 8*
    ETHIONINE 164
    HOMOGENATE 16
    INJURY 163
    LIPOPROTEINS 669
    LIVER DISEASES 678, 685
    NUCLEIC ACIDS 158
    PERFUSION 176
    PROTEIN 8*
    REGENERATION 176
    VITAMIN D 95
  PARIETAL CELL
    PENTAGASTRIN 1*
  SMALL INTESTINE
    ALCOHOL 5*
    MOTILITY 61
  STOMACH
    ENDOCRINE SYSTEM 10
    PENTAGASTRIN 1*
  VILLI
    CELIAC DISEASE 487*

VAGOTOMY
  ACID SECRETION
    HEIDENHAIN POUCH 89*
  DUODENUM
    DIVERTICULUM 438
    ULCER 390
  DYSPEPSIA
    TREATMENT 419
  PEPTIC ULCER 383
  SECRETION
    STOMACH 414
  SEQUELAE 333, 389, 419
  STOMACH
    ELECTROPHYSIOLOGY 76
    MOTILITY 76
    NERVOUS SYSTEM 336
    PRESSURE STUDIES 76
  ULCER
    SURGERY 407

VARICES
  ESOPHAGUS
    DIAGNOSIS 218, 264*
    DISEASES ASSOCIATED WITH 270
    RADIOLOGY 218
    SURGERY 283, 297, 307
    VASOCONSTRICTORS 839*
  STOMACH
    RADIOLOGY 201

VASOCONSTRICTORS
  ESOPHAGUS
    VARICES 839*
  GASTROINTESTINAL
    BLEEDING 839*
  STOMACH
    BLEEDING 314*

VASOPRESSIN
  HORMONE
    REVIEWS 195

VILLI
  DUODENUM
    NEOPLASMS, BENIGN 473
  INTESTINE
    ASPIRIN 441
    CORTICOSTEROIDS 441
  RECTUM
    ELECTROLYTE 601
  SMALL INTESTINE
    MORPHOLOGY 2*
  ULTRASTRUCTURE
    CELIAC DISEASE 487*

VIRUS
  ANTIBODIES
    HEPATITIS, CHRONIC 776
  LIVER
    CELLS 721*
  SMALL INTESTINE
    INFECTION 453
    MUCOSA 430*

VITAMIN A
  AMINO ACIDS
    TRANSPORT 45

- LIVER
  - INJURY 171
- PANCREAS
  - CYSTIC FIBROSIS 628

VITAMIN B1
- DEFICIENCY
  - LIVER 175

ITAMIN B12
- INTRINSIC FACTOR
  - ABSORPTION 38*
- LIVER
  - CHEMICAL COMPOSITION 687
  - REGENERATION 96

ITAMIN D
- LIVER
  - ULTRASTRUCTURE 95
- MALABSORPTION
  - BLIND LOOP SYNDROME 525
  - DISEASES ASSOCIATED WITH 525
- SMALL INTESTINE
  - ABSORPTION 180*
- TRANSPORT
  - CALCIUM 26*, 34

ITAMIN E
- LIVER
  - INJURY 161
- PANCREAS
  - CYSTIC FIBROSIS 628

ITAMIN K
- DEFICIENCY
  - PROTHROMBIN 670

VOLVULUS
- GALLBLADDER
  - CHILDREN 829
- SMALL INTESTINE
  - DISEASES ASSOCIATED WITH 496
- STOMACH 276

WATER
- STOMACH
  - ELECTROPHYSIOLOGY 66

WHIPPLES DISEASE
- ETIOLOGY
  - BACTERIA 484*

WILSONS DISEASE
- COPPER
  - METABOLISM 654*
- DISEASES ASSOCIATED WITH
  - GLUCOSE INTOLERANCE 663

XYLOSE
- ABSORPTION
  - CELIAC DISEASE 506, 508
  - DIAGNOSIS 508
  - GIARDIASIS 508
  - MALNUTRITION 508
- MALABSORPTION
  - DIAGNOSIS 528

ZOLLINGER-ELLISON SYNDROME
- DIAGNOSIS 875
  - TECHNIQUES 338

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PREFACE

GASTROENTEROLOGY ABSTRACTS and CITATIONS is a publication of the National Institute of Arthritis, Metabolism and Digestive Diseases. This specialized information medium has been initiated to fill an existing great need in the field of gastroenterology and to assist the Institute in meeting its obligations to foster and support laboratory and clinical research into the nature, causes, and therapy of diseases of the gastrointestinal tract. Publication GASTROENTEROLOGY ABSTRACTS and CITATIONS makes available citations of all current papers relevant to this field from medical journals published throughout the world. Approximately one-third of the citations dealing with the major aspects of gastroenterology have accompanying abstracts.

The issuing of GASTROENTEROLOGY ABSTRACTS and CITATIONS under the auspices of the National Institute of Arthritis, Metabolism, and Digestive Diseases will provide a much needed current awareness tool to scientists and will facilitate greater integration of research and clinical efforts in this field. The number and great diversity of publications in the area of gastroenterology makes it imperative that an appropriate service be available to investigators and practitioners so that they may be apprised of progress with a minimum of delay. Our aim is to provide the readers with a readily systematized complilation of current published work. The publication will provide the greatest usefulness if these interested investigators will contribute their ideas and comments for consideration whenever possible.

GASTROENTEROLOGY ABSTRACTS and CITATIONS is published monthly and includes citations and abstracts from the biomedical world literature as they are currently received. Volume 7 will appear in, and be dated, 1973. There will be no hiatus in literature coverage from Volume 6 which was dated 1971. In addition, yearly cumulated subject and author indexes are published.

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CONTENTS

Abstracts, Citations — Page

PRE-CLINICAL SCIENCES

Morphology, Cellular Structure and Histochemistry . . . 0909-0942 77
Absorption--Excretion--Transport . . . 0943-0972 81
Motility . . . 0973-0992 84
Secretion and Metabolism . . . 0993 87
  Stomach . . . 0994-1031 88
  Pancreas . . . 1032-1050 92
  Hepatobiliary Tract . . . 1051-1152 94
  Intestine . . . 1153-1169 103
General . . . 1170-1186 105

DIAGNOSTIC PROCEDURES . . . 1187-1290 108

GASTROINTESTINAL DISEASES

Esophagus . . . 1291-1339 115
Stomach . . . 1340-1382 118
  Peptic Ulcers . . . 1383-1430 121
Small Intestine . . . 1431-1466 126
  Regional Enteritis . . . 1467-1483 128
  Malabsorption . . . 1484-1515 129
Large Intestine . . . 1516-1613 132
  Ulcerative Colitis . . . 1614-1626 139
Pancreas . . . 1627-1651 140
  Pancreatitis . . . 1652-1673 142
Liver and Biliary Tract . . . 1674-1724 144
  Hyperbilirubinemic States . . . 1725-1736 147
  Nonviral Hepatitis and Hepatic Injury . . . 1737-1754 149
  Acute Viral Hepatitis . . . 1755-1792 150
  Chronic Hepatitis . . . 1793-1804 154
  Alcoholic Liver Disease . . . 1805-1816 157
  Cirrhosis . . . 1817-1844 158
  Gallbladder and Biliary Tract Diseases . . . 1845-1882 160

General . . . 1883-1948 162
  Parasitology . . . 1949-1969 167

AUTHOR INDEX

SUBJECT INDEX

The Secretary of the Department of Health, Education, and Welfare has determined that the publication of this periodical is necessary in the transaction of the public business required by law of this Department. Use of funds for printing this periodical has been approved by the Director of the Office of Management and Budget through April 30, 1975.

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LANGUAGE ABBREVIATIONS

Afr.	Afrikaans
Ar.	Arabic
Bul.	Bulgarian
Ch.	Chinese
Cz.	Czech
Dan.	Danish
Dut.	Dutch
E.	English
Eston.	Estonian
Fin.	Finnish
Fl.	Flemish
Fr.	French
Ger.	German
Gr.	Greek
Heb.	Hebrew
Hun.	Hungarian
Ic.	Icelandic
In.	Indonesian
It.	Italian
Jap.	Japanese
Kor.	Korean
Latv.	Latvian
Lith.	Lithuanian
Nor.	Norwegian
Pol.	Polish
Por.	Portuguese
Rum.	Rumanian
Rus.	Russian
Ser.	Serbo-Croatian
Sl.	Slovak
Sp.	Spanish
Sw.	Swedish
Th.	Thai
Turk.	Turkish
Uk.	Ukrainian
Viet.	Vietnamese

ABBREVIATIONS USED IN ABSTRACTS

ACTH	adrenocorticotropic hormone
ADP	adenosine diphosphate
AMP	adenosine monophosphate
ATP	adenosine triphosphate
BSP	sulfobromophthalein
C	degrees centigrade
cm	centimeter(s)
CNS	central nervous system
cpm	counts per minute
DNA	deoxyribonucleic acid
e.g.	for example
g	gram(s)
µg	microgram(s)
hr	hour(s)
i.m.	intramuscular
i.p.	intraperitoneal
IU	international unit(s)
i.v.	intravenous
kg	kilogram(s)
LD_{50}	median lethal dose(s)
LDH	lactic acid dehydrogenase
m	meter(s)
M	molar
mEq	milliequivalent(s)
mM	millimolar
µM	micromolar
mC,µC	milli-,microcurie(s)
mg	milligram(s)
min	minute(s)
ml	milliliter(s)
mm	millimeter(s)
MTD	maximum tolerated dose
ng	nanogram (10^{-9})
pg	picogram (10^{-12})
p.o.	orally
ppm	parts per million
r	Roentgen
RBC	red blood cells (erythrocytes), red blood count
resp.	respectively
Rev.	review (only in citations)
RNA	ribonucleic acid
s.c.	subcutaneous
sec	second(s)
SGOT	serum glutamic-oxalacetic transaminase
SGPT	serum glutamic-pyruvic transaminase
U	unit(s)
UV	ultraviolet
WBC	white blood cells (leukocytes), white blood count
yr	year(s)

PRE-CLINICAL SCIENCES

MORPHOLOGY, CELLULAR STRUCTURE AND HISTOCHEMISTRY

0909 LIVER SINUSOIDAL CELLS: IDENTIFICATION OF A SUBPOPULATION FOR ERYTHROCYTE
CATABOLISM. *(E.)* Bissell, D. M.; Hammaker, L.;
Schmid, R. (Univ. California, Dept. Med., San
Francisco). *J. Cell Biol.* 54:107-119, 1972.

Sequestration and degradation of RBC are believed
to occur in part in the liver, but the magnitude
nd cellular localization of this process remain
ncertain. This problem was studied in male
Sprague-Dawley rats. Isolated parenchymal and
inusoidal cell populations of the liver were
xamined. After digesting the perfused liver with
ronase, hepatic sinusoidal cells were isolated
ree of RBC and debris. Of the isolated cells, 90%
ere phagocytic, judging by their uptake of collodial
^{98}Au or of aggregated albumin-^{131}I administered
n *vivo*. After administration of spherocytic (heat-
reated) RBC, however, only about 1/4 of the isolated
ells contained phagocytized RBC. This apparently
istinct population of RBC-phagocytizing cells is
esignated as "erythrophagocytic (EP)" cells. The
? cell population was characterized functionally
y its specific phagocytosis of colloidal carbon
nd of ^{99m}technetium-sulfur colloid and histochemically
its peroxidase activity. The role of the EP
opulation in the catabolism of RBC-hemoglobin was
udied in isolated hepatic sinusoidal cells by
ssay of microsomal heme oxygenase (MHO), which is the
ducible enzyme system that converts heme to
lirubin. The MHO activity of individual sinusoidal
olates were related directly to their content of
cells. Since the total MHO activity of the EP
ll population of the liver is 75% of the total
zyme activity in the spleen, these two tissues
y be of comparable importance in their ability
degrade RBC hemoglobin.

10 EFFECT OF PHENOBARBITAL ON SMALL INTESTINAL STRUCTURE AND FUNCTION IN THE RAT. *(E.)*
omas, F. B.; Baba, N.; Greenberger, N. J.; Salsburey,
(Ohio State Univ. Coll. Med., Columbus, Ohio).
Lab. Clin. Med. 80(4):548-558, 1972.

determine the specificity of the effect of pheno-
rbital (PB) on iron absorption and heme-splitting
zyme activity, studies were carried out with
ale Sprague-Dawley rats to characterize the
ect of PB on the absorption of other nutrients
on the activity of various small intestinal enzymes.
ium PB was administered i.p. in 0.9% saline at
mg/kg/day for 3 or 5 days. Sometimes hydrocortisone
mg/kg) was substituted for the PB. The effect
PB on small intestinal ultrastructure was studied.
rted gut sacs were obtained 12-16 hr past injec-
n. In contrast to the stimulatory effect of PB
iron absorption, it did not significantly affect
mucosal uptake, mucosal to serosal transfer, or
osal:mucosal concentration ratio of ^{14}C-3-0-
hyl glucose and ^{14}C-L-leucine by everted jejunal
sacs *in vitro*. Similarly, there was no effect
PB on the mucosal uptake and transfer of ^{14}C-
itic acid by isolated intestinal loops *in vivo*.
However, PB resulted in striking hypertrophy of small intestinal smooth endoplasmic reticulum and this was associated with marked increase in gut microsomal n-demethylase activity as compared to controls. On the other hand, small intestinal sucrase activity was not affected by PB, the values being similar to those of controls. Only the absorption of iron is significantly enhanced by PB pretreatment.

0911 HISTOCHEMICAL DISTRIBUTION OF CARBONIC ANHYDRASE AFTER LIGATION OF THE PANCREATIC DUCT. *(E.)* Chung, A.; Richter, W. R. (Dept. Pathol., Univ. Chicago, Ill.). *Am. J. Pathol.* 68(1):23-30, 1972.

The distribution of carbonic anhydrase (CA) in the exocrine pancreas of male Sprague-Dawley rats has been examined during the first 3 weeks after ligation of the pancreatic duct. The normal pattern of positive reaction in ducts, centroacinar cells, and capillaries changed, by the end of the first week, to one in which all the cells in the dilated ducts contained CA. This situation persisted through the third week. By electron microscopy the enzyme was found on the apical membranes of ductular, centroacinar, and acinar cells, as well as on the surface membranes of the modified cells at 1 week. High CA activity suggests that ductular dilatation is largely due to fluid secretion by cells lining the dilated ducts. Distention apparently continues until equilibrium is reached between fluid secretion and filtration back through the duct wall; this requires about 1 week. The ability of pancreatic acinar cells to manufacture even small amounts of CA and alkaline phosphatase implies that with changes in morphology and function, the amount of enzyme made can also be changed and the cells in the dilated ducts might be of acinar origin.

0912 RADIOAUTOGRAPHIC AND CHEMICAL EVIDENCE FOR 5-^{3}H MEVALONATE INCORPORATION INTO CHOLESTEROL BY RAT VILLOUS ABSORPTIVE CELLS. *(E.)* Mak, K.; Trier, J. S. (Boston Univ. Sch. Med., Mass). *Biochim. Biophys. Acta* 280(2):316-328, 1972.

The cellular sites of mevalonic acid incorporation into cholesterol in the small intestinal wall were studied by radioautographic and chemical methods. 5-^{3}H mevalonate was instilled into the serosal compartment of rat ileal everted sacs and incubated for 15, 30, and 60 min. Sacs incubated 15 min were labeled too lightly for morphological evaluation; 60 min incubation revealed good preservation of mucosal structure; longer than 60 min showed epithelial cell degeneration. Sixty min was selected as the incubation time. Portions of the sacs were fixed in digitonin-containing aldehyde, digitonin-free aldehyde, or were used directly for chemical analyses. Radioautographs of I µm Epon-embedded sections from digitonin-aldehyde fixed tissue showed heavy labeling of absorptive cells lining the upper two-thirds of the villi, moderate labeling of those lining the lower third, and little labeling of crypt epithelium. Within absorptive cells, grain density over the microvillous region was higher than that over the rest of the cytoplasm. After fixation and acetone dehydration, 24.9% of lipid radioactivity was retained in tissue. Thin-layer chromatography revealed that 85.1% of retained lipid radioactivity was in unesterified sterols, representing 1.4% of the newly synthesized ^{3}H-labeled unesterified sterols found in companion unfixed segments of the sacs. Digitonin-free aldehyde fixation resulted in only light labeling of radioautographs of absorptive cells and in only 6.6% retention of ^{3}H-labeled unesterified sterols. Thus, exogenously administered ^{3}H-labeled mevalonate is incorporated into digitonin-precipitable sterols primarily in villous absorptive cells in everted sacs of rat ileum.

0913 THE ROLE OF PERISINUSOIDAL CELLS IN HEPATIC FIBROGENESIS: AN ELECTRON MICROSCOPIC STUDY OF ACUTE CARBON TETRACHLORIDE LIVER INJURY. *(E.)* McGee, J. O.; Patrick, R. S. (Glasgow Roy. Infirm., Scotland). *Lab. Invest.* 26(4):429-440, 1972.

An electron microscopic investigation of hepatic sinusoids was undertaken in normal mice and in mice with acute liver damage induced by a single dose of carbon tetrachloride (0.2 ml of 40% CCl_4 in mineral oil p.o. through a stomach tube) in an effort to identify the cell type involved in intralobular fibrinogenesis. In normal liver, perisinusoidal cells, which lie entirely within Disse's space, have many of the morphologic features generally associated with collagen formation in connective tissue cells: a well developed rough endoplasmic reticulum containing an electron-dense flocculent material, fine intracytoplasmic filaments, a Golgi apparatus, and cytoplasmic lipid droplets. Fine extracellular fibrils are often seen close to their plasma membrane. The liver tissue from the poisoned group was preselected for study by its ability to concentrate [^{3}H]-proline in the centrilobular zones. In these specimens excess collagen is depositied throughout the centrilobular zones in associaton with typical fibroblasts, which are found initially in close apposition to hepatic sinusoids, and around central veins. These centrilobular fibroblasts may be derived from preexistent perisinusoidal cells and their counterparts around the central vein, which have undergone hypertrophy and hyperplasia. This is supported by a marked increase in the sinusoidal [^{3}H] thymidine concentration after injury. Sinusoidal lining cells play no part in parenchymal fibrinogenesis. Fibrosis in the acutely damaged liver is due to *de novo* connective tissue synthesis by perisinusoidal cells. There is no positive evidence that condensation of preformed reticulin plays any part in its development.

0914 ULTRASTRUCTURE OF INTESTINAL MITOCHONDRIA. III. QUALITATIVE AND QUANTITATIVE CHANGES IN FASTED AND NONFASTED SUCKLING RATS. *(E.)* Gonzalez-Licea, A. (I.M.S.S. Natl. Med. Ctr., Mexico City). *Lab. Invest.* 26(4):403-408, 1972.

Mitochondria in absorptive cells of the small intestine undergo marked qualitative and quantitative changes when animals are either suckling or fasting. White 5-day-old suckling rats (31) were studied. In 12 nonfasted suckling rats mitochondria have numerous cristae, few of which are adherent, and the matrix is denser than the surrounding cytoplasm. Mitochondrial contact with fat droplets, nucleus, or other mitochondria is also seen frequently. On the other hand, mitochondria in 24-hr-fasted rats have a light matrix and few cristae, most of which are adherent to each other. However, in some animals of this group there is a different mitochondrial morphology. Mitochondria are small, their matrix is not as pale as in the other mitochondria seen in 24-hr-fasted suckling rats, and the number of adherent cristae decreases. In 7 30-hr-fasted animals the mitochondria also display more abundant cristae than those of the large mitochondria seen in 24-hr-fasted rats. Cristae adhesion is considerably reduced and matrical density is increased, being comparable to that of nonfasted suckling rats. Mitochondria decrease in size according to time of fasting. The smallest mitochondria are seen in 30-hr-fasted animals. The number of mitochondria per cell is similar in all groups studied. Both the qualitative and quantitative changes are morphologic manifestations of different respiratory stages and/or of ion and water transport carried out by mitochondria. Such changes may be influenced by the functional environment present in the absorptive cell.

0915 THE FINE STRUCTURE OF INTESTINE AND LIVER IN IRRADIATED MICE DURING FAT ABSORPTION. *(E.)* Hampton, J. C.; Rosario, B. (Pacific Northwest Lab., Richland, Wash.). *Radiat. Res.* 52(1):152-167, 1972.

C57Br/cdj mice (31 in number, 12-15g body weight) were exposed to 1500 R whole-body x-irradiation and sacrificed 1 to 4 days postirradiation. Each mouse received 0.2 ml of safflower oil-^{3}H-palmitic acid 30 min before sacrifice. Specimens of ileum, jejunum, and liver were examined with light and electron microscopes. Through 2 days postexposure, absorption and transport of lipid in both ileum and jejunum were normal and liver glycogen and lipid content were stable. Beginning on day 3, ileal function failed rapidly but the jejunum functioned normally. On day 3.5 jejunal absorption declined and hepatocytes were virtually depleted of glycogen and of intracellular lipid. Changes in absorption paralleled subcellular changes in epithelial cells, e.g., mitochondria were abnormal in appearance and reduced in number, ribosomes were depleted, and only remnants of endoplasmic reticulum and Golgi membranes remained. The cellular effects observed coincide with the onset of protein synthesis inhibition in epithelial cells exposed to x-rays, suggesting that irradiated cells lost the ability to synthesize the protein necessary to maintain the intracellular enzyme systems required for normal metabolism and the exportable protein components of chylomicrons.

'ailure of protein synthesis is attributed to nhibition of ribonucleoprotein synthesis or of 'ibosomal assembly, rather than to a direct effect n existing ribosomes.

916 QUANTITATIVE VARIATIONS IN THE DISPOSITION OF THE ENTERIC SURFACE COAT IN MOUSE EJUNUM. *(E.)* Rao, S. N.; Mukherjee, T. M.; Wynn illiams, A. (Univ. Otago Med. Sch., Dunedin, New ealand). *Gut* 13:33-38, 1972.

tilizing colloidal iron staining to localize cid mucosubstances both at light and electron icroscopic levels it has been observed that in ZCW and CBA/H-T_6T_6 mice there is a distinct variation in the cell-to-cell disposition of the enteric rface coat. This suggests metabolic differences etween neighboring villous cells. It has been ferred that this glycoprotein surface coat is not uniform smearing of the epithelial cells by goblet ell mucus. It was also found that each cell ssesses and synthesizes its own individual surface at, with some cells exhibiting more, others less; ill others are deficient in surface coat at a ven time. These observed variations could well flect the maturity and functional state of the sorptive cells.

17 A COMPARATIVE STUDY OF THE MOLECULAR STRUCTURES OF THE PLASMA MEMBRANES AND E SMOOTH AND THE ROUGH ENDOPLASMIC-RETICULUM MEMANES FROM RAT LIVER. *(E.)* Morin, F.; Tay, S.; mpkins, H. (Univ. Montreal, Quebec, Canada). *ochem. J.* 129(3):781-788, 1972.

asma-membrane and smooth-,rough- and degranulated-doplasmic-reticulum-membrane fractions were isolated om the microsomal pellet of rat liver. The purity these fractions, as determined by marker-enzyme tivities, electron microscopy, cholesterol content RNA content, was adequate for a comparative uctural study. There were major differences in id and protein composition between the plasma memane and the endoplasmic reticulum, but not between smooth and the rough fractions of the endosmic reticulum. Differences in the location of brane protein thiol groups and the mobility of membrane phospholipids were observed between the sma membranes and the endoplasmic reticulum. These ld be accounted for by differences in protein and id composition. However, by using fluorescence spin-labelling techniques, structural changes e also observed between the smooth and the rough oplasmic-reticulum fractions. These results gest that the structural heterogeneity existing ween the two latter membrane fractions occurs near on their membrane surfaces and is not due to the ater number of ribosomes bound to the rough oplasmic-reticulum fraction.

3 MORPHOGENESIS OF INTESTINAL VILLI: I. SCANNING ELECTRON MICROSCOPY OF THE DUOAL EPITHELIUM OF THE DEVELOPING CHICK EMBRYO. *(E.)* Grey, R. D. (Univ. California, Dept. Zool., Davis). *J. Morphol.* 137(2):193-214, 1972.

Development of villi in the duodenum of the chick was studied in stages up to one week after hatching. The duodenal lumen of a 6 day embryo is a fairly smooth-surfaced tube lined by a pseudostratified epitheluim. Formation of definitive villi is proceded by development of a set of previllous ridges that run lengthwise along the duodenum. At 8 or 9 days 2 ridges running lengthwise along the gut, arise directly opposite each other and push into the lumen. At 9 or 10 days 2 more ridges appear snychronously, each in valleys between the first ridges. At 10 or 11 days 4 new ridges arise. The first set of 16 previllous ridges (set I) is complete by about 13 days of incubation; all ridges in the set are fairly uniform. Previllous ridges in set I fold into a highly regular zigzag pattern between 14 and 16 days of incubation. Definitive villi develop from set I ridges beginning at about 17 days when populations of distinct cells appear on the crests of the ridges between angles in the zigzag folds. Cells in these populations lack the rounded appearance of cells seen in earlier stages; their apical surfaces are densely covered with microvilli. A second set of villi (set II) develops at about 16 days of incubation when about 16 rows of tongue-like flaps erupt between the previllous ridges of set I. At hatching, set II villi are still smaller than villi of set I; this distinction disappears by about the 4th day after hatching.

0919 CHANGES IN LIVER MORPHOLOGY, FUNCTION AND CIRCULATION IN DOGS SUBJECTED TO LOBAR BILE DUCT OBSTRUCTION. *(E.)* Ohlsson, E. G. (Malmo Gen. Hosp., Sweden). *Acta Chir. Scand.* 138:279-287, 1972.

Bile ducts from the left lateral and left medial liver lobes were carefully ligated in 11 mongrel dogs. After 4 weeks the dogs were fasted 12 hr, subjected to laparotomy, and ^{85}Sr- and ^{141}Ce-labeled microspheres were injected into the left and right branches of the portal vein, resp. At autopsy the unobstructed lobes appeared somewhat enlarged, but showed no histological changes. The obstructed lobes were smaller and darker with yellow spots, and their parenchyma felt tougher. Blood bilirubin levels increased slightly. Alkaline phosphatase increased significantly after 1 week and then decreased, but activities were still significantly increased in the 4th week; similar changes were noted in SGPT activities. SGOT activity increased significantly during the 1st week and returned to normal after 4 weeks; similar changes were noted in the GT (not further defined) activity. No changes occurred in hemoglobin content or portal pressure. Histological changes were significant but less pronounced than in dogs with total bile duct obstruction. Portal zones were enlarged by fibrosis with ductular proliferation but minimal inflammation. No interconnecting portal fibrosis was observed. Small areas of fatty degeneration were evident.

Some liver cells around the central vein appeared atrophied with dilated sinusoids. Intrahepatic portovenous shunting of the labeled microspheres was observed in bile-obstructed liver lobes in 2 of 6 dogs but was not seen in the lobes with undisturbed bile flow. Uptake of i.v. injected colloidal ^{198}Au was significantly lower in obstructed than in unobstructed lobes. Since histological changes occurred only in obstructed lobes, these changes must be attributed to local biliary stasis and possibly to a generalized retention of some bile product in the plasma.

0920 RESPONSES OF HEPATIC MICROVESSELS. *(E.)* Ho, M. S. L. (Dept. Physiol., Univ. Hong Kong). *Q. J. Exp. Physiol.* 57(2):226-232, 1972.

0921 STEREOSTRUCTURAL STUDIES ON NERVE DISTRIBUTION IN THE GASTROINTESTINAL TRACT OF HUMAN FETUS AND NEWBORN, ESPECIALLY FROM THE PYLORIC PORTION OF THE STOMACH TO THE DUODENAL CAP. *(Jap.)* Nagayama, T. (Tokyo Med. Coll., Japan). *J. Tokyo Med. Coll.* 29(4):375-417, 1971.

0922 ISOLATION OF RIBOSOMES FROM POST-NUCLEAR FRACTION OF RAT LIVER IN NEARLY QUANTITATIVE YIELD. *(E.)* Venkatesan, N.; Steele, W. J. (Dept. Pharmacol., Univ. Iowa, Iowa City). *Biochim. Biophys. Acta* 277(3):646-650, 1972.

0923 THE EFFECT OF PRIOR DOSING WITH PHENOBARBITONE AND β-DIETHYLAMINOETHYL DIPHENYLPROPYL ACETATE (SKF525A) ON THE TOXICITY AND LIVER LESION CAUSED BY NGAIONE IN THE MOUSE. *(E.)* Seawright, A. A.; Hrdlicka, J. (Vet. Sch., Univ. Queensland, Brisbane, Australia). *Br. J. Exp. Pathol.* 53:242-252, 1972.

0924 FUNCTIONAL MORPHOLOGY OF EFFERENT GASTRIC INNERVATION. *(Rus.)* Turevskii, A. A. (Grodno Med. Inst., USSR). *Dokl. Akad. Nauk Beloruss. SSR* 16(7):657-660, 1972.

0925 SUBCELLULAR DISTRIBUTION OF ASPARTATE CARBAMYLTRANSFERASE IN THE LIVER. *(It.)* Grillo, M. A. (Ist. Chim. Biol., Univ. Sassari, Italy). *Boll. Soc. Ital. Biol. Sper.* 57(22):763-765, 1971.

0926 A STUDY OF THE HEPATIC MICROCIRCULATION. *(E.)* Ho, M. S. L.; Ma, R. Y. P. (Dept. Physiol., Univ. Hong Kong). *Q. J. Exp. Physiol.* 57(2):233-236, 1972.

0927 BIOCHEMICAL HETEROGENEITY OF RAT LIVER MITOCHONDRIA SEPARATED BY RATE ZONAL CENTRIFUGATION. *(E.)* Wilson, M. A.; Cascarano, J. (Dept. Zool., Univ. California, Los Angeles). *Biochem. J.* 129(1):209-218, 1972.

0928 EFFECTS OF SELECTED CHELATING AGENTS AND METALS ON THE STABILITY OF LIVER LYSOSOMES. *(E.)* Chvapil, M.; Ryan, J. N.; Brada, Z. (Univ. Arizona, Coll. Med., Tucson). *Biochem. Pharmacol.* 21(8):1097-1105, 1972.

0929 STUDY OF CELLULAR INCLUSION IN THE HUMAN FOETAL INTESTINAL NEURON. *(E.)* Chaudhary, S. C. (R.N.T. Med. Coll., Udaipur, India). *Indian J. Med. Res.* 59(7):1124-1127, 1971.

0930 HISTOLOGICAL CHANGES IN THE SPLEEN, THYMUS, AND LIVER OF RATS FOLLOWING TREATMENT WITH PHYTOHEMAGGLUTININ *IN VIVO*. *(It.)* Source, G.; Tosi, P.; Farabollini, F. (Inst. Hum. Physiol., U. Siena, Italy). *Boll. Soc. Ital. Biol. Sper.* 57(23):808-811, 1971.

0931 CHANGE IN CELL KINETICS OF THE GASTRIC SURFACE EPITHELIUM IN UREMIA. AUTORADIOGRAPHIC INVESTIGATION WITH THE PERCENTAGE OF LABELED MITOSES METHOD. *(Ger.)* Castrup, H. J.; Lennartz, K. J. (Pathol. Inst., Univ. Cologne, Germany). *Beitr. Pathol.* 146(4):315-321, 1972.

0932 IMMUNE REACTIONS IN MUCOUS MEMBRANES. IV. HISTOCHEMISTRY OF INTESTINAL MAST CELLS DURING HELMINTH EXPULSION IN THE RAT. *(E.)* Miller, H. R. P.; Walschaw, R. (Pasteur Inst., Paris, France). *Am. J. Pathol.* 69(1):195-208, 1972.

0933 VARIETIES OF DOPAMINE-CONTAINING CELL IN THE DUODENAL MUCOUS MEMBRANE OF THE SHEEP. *(E.)* Atkins, A. M.; Schofield, G. C.; Wreford, N. G. M. (Dept. Anat., Monash Univ., Clayton, Australia). *Experientia* 28(9):1081-1082, 1972.

0934 CHRONOLOGICAL TRANSITION OF THE FUNDIC-PYLORIC BORDER DETERMINED BY STEPWISE BIOPSY OF THE LESSER AND GREATER CURVATURES OF THE STOMACH. *(E.)* Kimura, K. (Fac. Med., Univ. Tokyo, Japan). *Gastroenterology* 63(4):584-592, 1972.

0935 HISTOCHEMICAL STAINING OF ZYMOGEN GRANULES OF PANCREATIC ACINAR CELLS USING A PERMANGANATE-HID [HIGH IRON DIAMINE] TECHNIQUE. *(E.)* Klessen, C. (Anat. Inst., Univ. Tubingen, Germany). *Histochemie* 30(4):365-366, 1972.

0936 KARYOKINEISIS AND NUCLEAR MORPHOLOGY DURING LIVER CARCINOGENESIS. I. MITOSES AND MITOTIC ABNORMALITIES IN HEPATOCYTES AND HEPATOMA CELLS OF THE NITROSOMORPHOLINE-INTOXICATED RAT LIVER. *(Ger.)* Romen, W.; Bannasch, P. (Pathol. Inst., Univ. Wurzburg, Germany). *Virchows Arch. (Zellpathol.)* 11:24-33, 1972.

)937 MORPHOLOGY AND HISTOCHEMISTRY OF THE FETAL LIVER IN SPONTANEOUS ABORTIONS. *(Rus.)* ;ibiriakova, G. I.; Tsirel'nikov, N. I. (Novosibirsk Med. Inst., USSR.). *Vopr. Okhr. Materin. Det.* (6):62-55, 1972.

)938 LIVER AND BRAIN NUCLEIC ACIDS AND BODY COMPOSITION OF GROWING RATS FED DIELDRIN. *(E.)* ergen, W. G. (Dept. Animal Husbandry, Michigan State niv., East Lansing). *Proc. Soc. Exp. Biol. Med.* 40(4):1259-1262, 1972.

939 THE HISTOLOGICAL STRUCTURE OF STOMACH IN BAT *(Rhinofome kinneari)*. *(E.)* Swarup, .; Kumar, D.; Sinha, B. N. (Jawaharlal Nehru Med. oll., Aligarh Muslim Univ., India). *Indian J. Med. es.* 59(2):259-264, 1971.

940 STUDY OF THE EFFECT OF MECHANICAL VIBRATIONS ON THE MITOTIC CYCLE OF RAT LIVER CELLS *' VITRO*. *(Pol.)* Kwolek, A. (Silesian Acad. Med., atowice, Poland). *Folia Morphol. Warsz.* 31(3):421-29, 1972.

0941 INTESTINAL CRYPT SURVIVAL: THE EFFECT OF COBALT-60, 250 kVcp X-RAYS AND FISSION NEUTRONS. *(E.)* Sigdestad, C. P.; Scott, R. M.; Hagemann, R. F.; Darden, Jr., E. B. (Sch. Med., Univ. Louisville, Ky.). *Radiat. Res.* 52(1):168-178, 1972.

0942 AMINO ACID POOLS AND HEPATIC ENZYME ACTIVITIES IN RATS FED A MEAL OF HIGH OR LOW METHIONINE CONTENT. *(E.)* Sanchez, A.; Swendseid, M. E.; Clark, A. J.; Umezawa, C. (Sch. Health, Loma Linda Univ., Calif.). *Am. J. Clin. Nutr.* 25(6):550-554, 1972.

See also, 0953, 1102, 1115, 1140, 1490

ABSORPTION—EXCRETION—TRANSPORT

)43 UPTAKE OF VITAMIN E BY RAT SMALL INTESTINAL SLICES. *(E.)* Pearson, C. K.; Legge, A. M. ept. Biochem., Univ. of Aberdeen, Scotland). *Biochim. ophys. Acta* 288(2):404-412, 1972.

e uptake of vitamin E from micellar incubation
dia of varying composition has been examined in
t small intestinal slices. Incubations were
rried out at 37°C. About 82% of the radioactivity
covered from tissue lipids was associated with the
cosal layer, and was shown by thin-layer chroma-
graphy to be mostly unchanged vitamin E. The time
incubation did not affect this distribution.
tamin E uptake (30 min) was not affected: by
ding 5 mM monoolein, with or without 5 mM oleic
id, to 10 mM sodium taurodeoxycholate; by increasing
lium taurodeoxycholate from 10 to 30 mM; or
changing pH from 5.3 to 7.2. Uptake was greatly
luced by addition of an oil phase (triolein) to
micellar solution or by absence of a micellar
ase. When the concentration of vitamin E in the
ubation medium was increased beyond the turbidity
nt, a substantial change in uptake occurred in
of the experiments, although in 2/3 of the cases
inflection occurred at this point. Thus, uptake
almost as great in the presence of an emulsified
se.

4 EFFECT OF BILE SALTS ON THE GASTROINTESTINAL ABSORPTION OF DRUGS. IV. SITE OF ESTINAL ABSORPTION OF SODIUM TAUROCHOLATE AND ITS CONSEQUENCE ON DRUG ABSORPTION IN THE RAT. *(E.)* Kimura, T.; Sezaki, H.; Kakemi, K. (Fac. Pharm. Sci., Kyoto Univ., Japan). *Chem. Pharm. Bull.* 20(8):1656-1662, 1972.

The site specificity in the absorption of sodium taurocholate (STC), and its effect on drug absorption was investigated in male Wistar rats using the *in situ* perfusion technique. The absorption of STC by the jejunum was negligible both below and above the critical micellar concentration and it was absorbed solely by the ileum. Marked but variable changes in the absorbability of drugs was observed, depending upon the physicochemical nature and the absorptive characteristics of drugs. STC enhanced absorption of sulfaguanidine, sulfanilic acid, and N',N'-anhydro-*bis*-(β-hydroxyethyl)biguanide hydrochloride. STC decreased the absorption of 2-allyloxy-4-chloro-N-(2-diethylaminoethyl)benzamide hydrochloride, imipramine, and quinine. Site specificity was investigated in sulfaguanidine, imipramine, and quinine. STC enhanced absorption of sulfaguanidine in the ileum more than in the jejunum, while STC inhibited imipramine absorption less in the ileum. The effect of bile salts on gastrointestinal drug absorption is closely related to the site of the absorption of bile salts themselves. At the bile salt-absorptive site, enhancement of absorption due to an increase in membrane permeability is pronounced, while the inhibition of absorption due to the formation of the micellar complex is not.

0945 THE INTERRELATIONS OF FAECAL AMMONIA, pH AND BICARBONATE: EVIDENCE OF COLONIC ABSORPTION OF AMMONIA BY NON-IONIC DIFFUSION. *(E.)* Down, P. F.; Agostini, L.; Murison, J.; Wrong, O. M. (Dept. Med., Dundee Univ., Scotland). *Clin. Sci.* 43(1):101-114, 1972.

Ammonia, bicarbonate and pH were measured in samples of fecal dialysate obtained *in vivo* from 12 male and 1 female healthy subjects taking unrestricted diets and 4-10 dialysing capsules daily for 2-23 days. To observe the effect of marked changes in fecal pH, 3 subjects were studied while taking 25 mM/day of $MgCO_3$ or Na_2SO_4 by mouth for 10-18 days. Both salts increased stool weight without causing diarrhea, but stool pH was significantly increased by $MgCO_3$ and decreased by Na_2SO_4. The total ammonia concentration and pH of fecal dialysate were variable, showing a highly significant negative correlation similar to that established between urinary excretion of ammonia and urine pH. This relationship was more marked when individual subjects were studied while fecal pH was deliberately varied by administration of $MgCO_3$ and Na_2SO_4. The scatter of fecal ammonia concentrations was studied further in one case placed on a 40g protein diet with no mineral supplements for 3 weeks. Ammonia variations are partly due to diet and partly to the variable time spent by feces in the colon. Fecal bicarbonate concentrations were positively correlated with pH. Fecal Pco_2 was usually in the range 40-120 mmHg, the higher Pco_2 values being found in the more acid samples. Fecal total ammonia concentrations correlated negatively with fecal bicarbonate. Passive non-ionic diffusion is the main mechanism by which ammonia is absorbed by the colon. This does not exclude a minor contribution from diffusion of ionized ammonium. Colonic secretion of bicarbonate facilitates non-ionic diffusion of ammonia by providing an anion which is also absorbed by non-ionic diffusion, so maintaining an alkaline intraluminal reaction that continues to generate non-ionized ammonia.

0946 PROTEIN ABSORPTION BY THE INTESTINE OF THE FETAL RAT IN UTERO. *(E.)* Lev, R.; Orlic, D. (New York Med. Coll., N.Y.). *Science* 177(4048):522-524, 1972.

Horseradish peroxidase (molecular weight, about 40,000) injected (2 mg in 0.1 ml physiological saline) into the amniotic sacs in rats in day 19 and 20 of pregnancy has been identified ultrastructurally. At the first hr after injection there was only endogenous peroxidase activity. At 6 hr the jejunum and ileum showed evidence of peroxidase uptake in: apical region of the villi; in the absorptive cells confined to the microvillous border and to vesicular invaginations into the underlying apical cytoplasm; and in the region above the nucleus of the absorptive cells. The only change at 18 hr was less frequent observation in the microvillous border. Macromolecular protein within amniotic fluid swallowed by the fetus can be absorbed and transported by fetal intestine, and may indicate that physiological compounds can be transported by this enteric route to contribute to fetal development.

0947 THE EFFECT OF BACTERIA ON INTESTINAL UPTAKE OF VITAMIN B_{12}. I. EFFECT OF CULTURES OF BLIND-LOOP CONTENTS. *(E.)* Schjonsby, H. (Univ. Bergen Sch. Med., Norway). *Scand. J. Gastroenterol.* 7(2):119-128, 1972.

Cultures of blind-loop contents and blind-loop sediments obtained from rats with surgically created jejunal blind loops reduced the *in vivo* uptake of vitamin B_{12}, labeled with ^{57}Co and bound with rat gastric juice, by perfused rat intestinal loops. The intestinal uptake of labeled vitamin B_{12} was unaffected by blind-loop sediments from rats treated orally with neomycin and tetracyclin. The *in vitro* uptake of vitamin B_{12}, labeled with ^{57}Co and bound with rat gastric juice, was high in blind-loop sediments obtained from untreated rats, but low in sediments obtained from rats treated with oral antibiotics. The results suggest that the reduced intestinal vitamin B_{12} uptake is a consequence of bacterial uptake of the vitamin.

0948 EFFECT OF BACTERIA ON INTESTINAL UPTAKE OF VITAMIN B_{12}. II. THE CONSEQUENCES OF *IN VITRO* PREINCUBATION OF B_{12} WITH PURE BACTERIAL POPULATIONS. *(E.)* Schjonsby, H.; Hofstad, T. (Gade Inst., Univ. Bergen, Norway). *Scand. J. Gastroenterol.* 7(4):353-359, 1972.

The intestinal uptake and absorption of vitamin B_{12} in male Wistar rats was lower when the intrinsic-factor-bound vitamin was preincubated *in vitro* with populations of *Escherichia coli* and *Bacteroides fragilis* than when the vitamin was not pretreated in this way. Strains of *Streptococcus faecalis* and *Bifidobacterium* had no such effects. *In vitro* uptake of intrinsic-factor-bound vitamin B_{12} by *E. coli* and *B. fragilis* was high, while the uptake by *Str. faecalis* and *Bifidobacterium* was minimal. The results suggest that uptake by intestinal bacteria of intrinsic-factor-bound vitamin B_{12} may contribute to the malabsorption of the vitamin in the blind-loop syndrome.

0949 SODIUM-HYDROGEN ION EXCHANGE ACROSS CANINE RESTING GASTRIC MUCOSA. *(E.)* Bugajski, J.; Code, C. F.; Schlegel, J. F. (Mayo Clin., Rochester, Minn.). *Am. J. Physiol.* 222(4): 858-863, 1972.

The exchange of Na ion for H ion across the mucosa of Heidenhain pouches was studied in 4 healthy, well-trained female conscious dogs. Solutions (150 mM) of different concentrations of HCl and NaCl were instilled into the pouches after the animals fasted for 18-24 hr. Initial tests indicated that fasting did not eliminate basal secretion of either Na or H ion. Sometimes, after 1 hr, the contents had gained volume and Na ion in excess of the H ion was lost. When atropine (25 µg/kg), was administered 2-3 hr before testing, secretion of H ion was eliminated, but a slow, rather constant secretion of NaCl and $NaHCO_3$ persisted. When corrections were made for the Na ion and HCO_3 ion presumed to have been secreted during instillations of HCl in the pouches, then Na and H ions were found to exchange across the gastric mucosa on a mole-for-mole basis.

)950 RATES OF ABSORPTION BY RAT INTESTINE OF PANCREATIC HYDROLYSATES OF PROTEINS AND THEIR CORRESPONDING AMINO ACID MIXTURES. *(E.)* Crampton, R. F.; Gangolli, S. D.; Simson, P.; Matthews, D. M. (Br. Indust. Biol. Res. Assoc. Carshalton, England). *Clin. Sci.* 41(5):409-417, 1971.

comparison of the rates of intestinal absorption f pancreatic hydrolysates of four proteins with hose of the corresponding acid hydrolysates or mino acid mixtures was studied using male Sprague-awley rats starved overnight. A length of upper mall intestine, between 10 and 30 cm from the ylorus, was selected and 3 loops, 5 cm long were solated between ligatures; 0.25 ml of protein igest or amino acid solutions containing 40 μ mol f total α-amino nitrogen adjusted to pH 7 was njected into 2 of the loops and iso-osmotic mannitol olution into the 3rd. After a 10 min absorptive eriod the loops were excised, cut open, and ashed. The resulting solutions show that the bsorption of pancreatic hydrolysates, consisting argely of small peptides of 2 to 6 amino acid esidues, is substantially more rapid than that f the corresponding mixtures of free amino acids. he small intestine has a high capacity for absorption from mixtures of small peptides such as ight be produced during protein digestion. Mucosal ptake of intact oligopeptides is an important mode f protein absorption.

951 HUMAN INTESTINAL ABSORPTION OF GLUCOSE MEASURED BY PORTAL CATHETERIZATION. *(E.)* encker, H.; Gothlin, J.; Meeuwisse, G.; Tranberg, K. . (Dept. Surg., Univ. Lund, Sweden). *Scand. J. astroenterol.* 7(5):451-453, 1972.

952 SMALL INTESTINAL ABSORPTION OF D-GALACTOSE AND WATER IN FASTED AND ALLOXAN DIABETIC TS. *(E.)* Levinson, R. A.; Englert, Jr., E. (VA nt. Office, Washington, D.C.). *Experientia* 28(9): 39-1040, 1972.

53 EFFECT OF MATERNAL PROTEIN DEPRIVATION ON NEONATAL INTESTINAL ABSORPTION IN RATS. *.)* Loh, K. R. W.; Shrader, R. E.; Zeman, F. J. ept. Nutr., Univ. California, Davis). *J. Nutr.* 1(12):1663-1671, 1971.

54 EXPERIMENTAL PRODUCTION OF ELEVATED SERUM FOLATE IN DOGS WITH INTESTINAL BLIND LOOPS: LATIONSHIP OF SERUM LEVELS TO LOCATION OF THE IND LOOP. *(E.)* Bernstein, L. H.; Gutstein, S.; ron, G.; Wager, G. (Montefiore Hosp. Med. Ctr., onx, N.Y.). *Gastroenterology* 63(5):815-819, 1972.

55 SELECTIVE ABSORPTION OF MACROMOLECULES INTO INTESTINAL EPITHELIUM AND BLOOD BY NATAL MICE. *(E.)* Lecce, J. G. (Anim. Sci. Dept., rth Carolina State Univ., Raleigh). *J. Nutr.* (1):69-75, 1972.

0956 SITE OF PHOSPHORUS ABSORPTION FROM THE INTESTINE OF THE HORSE. *(E.)* Schryver, H. F.; Hintz, H. F.; Craig, P. H.; Hogue, D. E.; Lowe, J. E. (Equine Res. Program, Cornell Univ., Ithaca, N.Y.). *J. Nutr.* 102(1):143-148, 1972.

0957 EFFECT OF EXCESS L-HISTIDINE DIET ON ACTIVE TRANSPORT OF L-HISTIDINE BY ISOLATED RAT SMALL INTESTINE. *(E.)* Nakamura, Y.; Yasunoto, K.; Mitsuda, H. (Lab. Nutr. Chem., Kyoto Univ., Japan). *J. Nutr.* 102(3):359-363, 1972.

0958 THE ROLES OF BILE ACIDS DURING THE PROCESS OF NORMAL FAT AND CHOLESTEROL ABSORPTION. *(E.)* Holt, P. R. (St. Luke's Hosp. Ctr., New York). *Arch. Intern. Med.* 130(4):574-583, 1972.

0959 THE BODY WEIGHT COURSE AND VITAMIN B_{12} ABSORPTION AFTER TRANSPOSITION OF THE JEJUNUM AND ILEUM IN THE RAT. *(E.)* Groenqvist, B. (Univ. Hosp., Uppsala, Sweden). *Acta Chir. Scand.* 138:83-89, 1972.

0960 THYROXINE-INDUCED STIMULATION OF HEPATIC CELL TRANSPORT OF CALCIUM AND MAGNESIUM. *(E.)* Wallach, S.; Bellavia, J. V.; Gamponia, P. J.; Bristrim, P. (Dept. Med., State Univ. New York, Brooklyn). *J. Clin. Invest.* 51:1572-1577, 1972.

0961 CONDUCTANCE OF SUBMUCOSAL-FACING MEMBRANE OF FROG GASTRIC MUCOSA. *(E.)* Sanders, S. S.; O'Callaghan, J.; Butler, C. F.; Rehm, W. S. (Univ. Alabama, Med. Ctr., Birmingham). *Am. J. Physiol.* 222(6):1348-1354, 1972.

0962 EVALUATION OF A DIRECT METHOD FOR MEASURING ABSORPTION FROM THE GUT. *(E.)* Wangsness, P. J.; McGilliard, A. D. (Dept. Animal Sci., Iowa State Univ., Ames). *J. Dairy Sci.* 55(10):1432-1438, 1972.

0963 EVIDENCE FOR A PRIMARY ASSOCIATION BETWEEN IMMUNOBLASTS AND SMALL GUT. *(E.)* Moore, A. R.; Hall, J. G. (Gen. Infirm., Univ. Leeds, London, England). *Nature (Lond.)* 239(5368):161-162, 1972.

0964 AUTOMATED SEGMENTAL PERFUSION OF THE SMALL INTESTINE: A METHOD FOR MEASURING INTESTINAL ABSORPTION. *(Ger.)* Bloch, R.; Menge, H.; Lorenz-Meyer, H.; Riecker, E. O. (Med. Clin., Univ. Marburg, Germany). *Klin. Wochenschr.* 49(22):1218-1222, 1971.

0965 EFFECT OF CHOLECYSTOKININ-PANCREOZYMIN ON ACTIVE AND PASSIVE SUGAR ABSORPTION IN THE SMALL INTESTINE OF RATS. *(Ger.)* Rommel, K.; Bohmer, R.; Hotz, H. (Ctr. Int. Med. Pediatrics, Univ. Ulm, Germany). *Z. Gastroenterol.* 10(4):277-282, 1972.

0966 BIOCHEMICAL EFFECTS OF THE HYPOGLYCAEMIC COMPOUND DIPHENYLENEIODONIUM: CATALYSIS OF ANION-HYDROXYL ION EXCHANGE ACROSS THE INNER MEMBRANE OF RAT LIVER MITOCHONDRIA AND EFFECTS ON OXYGEN UPTAKE. *(E.)* Holland, P. C.; Sherratt, H. S. A. (Dept. Pharmacol., Univ. Newcastle upon Tyne, England). *Biochem. J.* 129(1):39-54, 1972.

0967 EFFECT OF *Vibrio cholera* TOXIN ON VASCULAR AND EXTRAVASCULAR SPACES OF RAT INTESTINE. *(E.)* Strombeck, D. R. (Univ. Illinois Coll. Med., Chicago). *Proc. Soc. Exp. Biol. Med.* 141(1):70-75, 1972.

0968 EFFECT OF INTRALUMINAL CONCENTRATIONS ON THE IMPAIRMENT OF GLYCINE ABSORPTION BY GLUCOSE IN THE HUMAN JEJUNUM. *(E.)* Cook, G. C. (Dept. Med., Univ. Zambia, Lusaka). *Clin. Sci.* 42(5):525-534, 1972.

0969 INFLUENCE OF O_2 AVAILABILITY ON GLUCOSE TRANSPORT IN THE ISOLATED INTESTINE OF ADRENALECTOMIZED RATS. *(E.)* Pietra, P.; Cappelli, V. (Inst. Gen. Physiology, Univ. Pavia, Italy). *Arch. Int. Physiol. Biochim.* (80):311-317, 1972.

0970 COMPARISON OF THE ABSORPTION OF URINARY CONSTITUENTS BY SMALL AND LARGE BOWEL CONDUITS IN DOGS. *(E.)* Vitko, R. J.; Cass, A. S. (Univ. Minnesota Med. Sch., St. Paul). *Invest. Urol.* 10(1):88-90, 1972.

0971 IONIC FLUXES AND PERMEABILITIES OF CELL MEMBRANES IN RAT LIVER. *(E.)* Claret, M.; Mazet, J. L. (Lab. Cell Physiol. C.N.R.S., Univ. Paris, Orsay, France). *J. Physiol. (Lond.)* (233): 279-295, 1972.

0972 PERSORPTION. *(Ger.)* Volkheimer, G. (no affil.). *Gastroenterol. Stoffwechsel* 2:1-77, 1972.

See also, 0910, 1156, 1165

MOTILITY

0973 INTESTINAL MOTILITY. II. ELECTRO-MOTOR CORRELATIONS IN THE CANINE SMALL INTESTINE. *(E.)* Hiatt, R. B.; Goodman, I.; Overweg, N. I. A. (Coll. Physicians Surg., Columbia Univ., New York). *J. Surg. Res.* 11(9):464-470, 1971.

Simultaneous pacesetter potentials were produced in Biebl loops by pretreatment with Coherin followed by intraluminal seratonin; these potentials were correlated visually with rhythmic mass spasms over the entire segment of the loops. Duodenal, jejunal, and ileal loops of intestine were included in separate Biebl loops in 3 mongrel dogs. Seven punctate electrodes were placed 2 cm apart in the muscularis of each loop, and electrical potential changes were recorded. By watching the gut contract and using a manual timing device, the circular muscle activity was correlated with electrical activity. With muscular activity and pacesetter potentials occurring simultaneously, the timing process for circular muscle activity within the electrical cycle was valid for the entire loop. To correlate longitudinal muscle contractions and the electrical cycle, two dogs with Biebl loops were reoperated on. The small intestine was divided just proximal to the loop, the proximal cut end anastomosed back to the small intestine (end-to-side) distal to the Biebl loop, and the distal cut end brought out through the midline fascia just proximal to the loop for a distance of 6 cm. The cut end was turned over inside out and sutured to the skin leaving a 3 cm everted loop. When longitudinal muscle contraction occurred, this gut would withdraw almost to skin level. If pacesetter potentials were occurring simultaneously throughout the loop, a correlation could be made between electrical and motor performance. Each animal was observed for 30 min on 3 occasions. In the hypermotile state the intestinal musculature is active throughout each electrical cycle of the basic electrical rhythm. The longitudinal muscle contracts just before or at the origin of the pacesetter potentials and terminates just prior to the midpoint between pacesetter potentials. The circular muscle immediately follows and contracts just prior to the midpoint between pacesetter potentials and terminates before the next pacesetter potentials.

0974 NORMAL DEGLUTITIVE RESPONSES OF THE HUMAN LOWER OESOPHAGEAL SPHINCTER. *(E.)* Kaye, M. D.; Showalter, P. J. (Univ. Colorado Med. Ctr., Denver). *Gut* 13(5):352-360, 1972.

The responses to deglutition of the lower esophageal high pressure zone were studied in 13 subjects, (11 male and 2 female, 23-39 yr old with mean of 31, all free from esophageal symptoms). The recording assembly included three perfused pressure recording catheters, whose recording orifices were at the same axial level, and a more distally situated *p*H electrode. Relaxation and contraction progressed in a sequential fashion along the length of the high pressure zone. At the time of maximum relaxation, a small pressure gradient, greatest at a point 1 cm distal to the pressure inversion point, was maintained between stomach and esophagus. The frequency of post-deglutitive contractions in the high pressure zone, which occurred distal to the pressure inversion point in all subjects, steadily increased as the recording assembly was withdrawn proximally. The amplitude of such contractions was greater in high pressure zone than in the distal esophagus. There was a significant correlation between maximum resting pressure and amplitude of contractions within the high pressure zone. The proper assessment of the function of the high pressure zone should include consideration of the spatio-temporal relationships of pressure events within the lower esophagus and the high pressure zone, in addition to measurements of their absolute dimensions. The *p*H electrode measurements, performed after the intragastric instillation of at least 150 ml of 0.1 N HCl, showed transient falls in the *p*H of the distal high pressure zone after deglutition in all subjects. These *p*H responses decreased in frequency as the *p*H electrode was withdrawn proximally, and did not occur in the non-sphincteric esophagus. Although gastro-esophageal competence is apparently retained during swallowing, the mucosal lining of the greater part of the high pressure zone is exposed to gastric contents for a few seconds after deglutition.

0975 HYPOTONIC DUODENOGRAPHY WITH THE USE OF GLUCAGON. *(E.)* Chernish, S. M.; Miller, R. E.; Rosenak, B. D.; Scholz, N. E. (Lilly Lab. Clin. Res., Indianapolis, Ind.). *Gastroenterology* 63(3):392-398, 1972.

In a double blind crossover barium X-ray study, the effect of 2 mg of glucagon on duodenal tonicity and motility was compared with the effect of normal saline in 12 asymptomatic male volunteers. There was a significant decrease in duodenal motility and tonicity when treatment with glucagon was compared with the response after the administration of normal saline. The radiologist reported a significant response and a significant enhancement of his ability to examine the duodenum by gas contrast after the dministration of glucagon. The possibility of this occurring by chance alone (i.e., when there is really no difference in the response to placebo and glucagon) is less than 1 in 1000. There was no effect of either medication on the barium coating of the duodenal mucosa. Mild to moderate symptoms of ausea, headache, dizziness, and a feeling of heat after the administration of glucagon were reported y 4 subjects, and 1 subject reported mild nausea nd dryness of the mouth after treatment with normal saline. These results suggest that glucagon dministration can induce sufficient hypotonicity nd hypomotility of the duodenum to provide a eliable demonstration of duodenal anatomy with inimal side effects.

0976 STUDIES OF GASTROINTESTINAL INTERACTIONS. I. A MATHEMATICAL ANALYSIS OF JEJUNAL INDICATOR CONCENTRATIONS USED TO CALCULATE JEJUNAL FLOW AND MEAN TRANSIT TIME. *(E.)* Lagerlof, H. O.; Ekelund, K.; Johansson, C. (Med. Dept., Karolinska Inst., Stockholm, Sweden). *Scand. J. Gastroenterol.* 7(4):379-389, 1972.

Jejunal flows and intestinal mean transit times in man were calculated after a marked test meal. The procedure involved continuous and successive infusion of unlabeled vitamin B_{12} and vitamin B_{12} labeled with ^{57}Co and ^{60}Co into the proximal duodenum and measurement of the concentrations 65 cm down the jejunum. A simple relation was found between the flow of indicator and change in mean transit time, Δtm. tm could be calculated directly from the relation between time and per cent single to total indicator. Flow could be calculated indirectly. Flow could also be calculated directly by means of an iteration procedure adapted to computer treatment and the tm indirectly. The methods were tested in a model, and good agreement was obtained between measured flow rate values and values obtained with various modifications of the above methods.

0977 THE EFFECT OF TRANSVERSE SECTION OF THE TAENIAE COLI (TAENIAMYOTOMY) ON INTRA-COLONIC PRESSURES IN THE RABBIT. *(E.)* Johnson, A. G. (Charing Cross Hosp. Med. Sch., London, England). *Scand. J. Gastroenterol.* 7(4):321-327, 1972.

Three fine saline-filled catheters, with end and side openings near the tip, were introduced into the proximal colon through the cecum in fasted, anesthetized New Zealand rabbits. The catheters were then connected to a recorder through pressure transducers. Transverse cuts of the two ante-mesenteric taenia were made at 0.5 cm intervals for a length of 5 cm. These cuts were made just deep enough to allow the cut ends of the taenia to separate. Contractions which developed in response to administration of prostigmine (0.05 mg i.v.) were recorded before section of the taeniae and at times varying from 30 min to 6 weeks afterward. A highly significant decrease in the total activity and motility index of the cut segment relative to the adjacent segments was found in 11 of 13 animals, and a significant decrease in the relative mean size of contraction was found for the series as a whole. These changes were more significant with increasing strength of contraction. It is concluded that the operation may have a place in the treatment of diverticular disease as an alternative to, or in combination with, longitudinal sigmoid myotomy.

0978 CHOLINERGIC RESPONSE TO THE LOWER ESOPHAGEAL SPHINCTER. *(E.)* Roling, G. T.; Farrell, R. L.; Gastell, D. O. (U.S. Naval Hosp., Philadelphia, Pa.). *Am. J. Physiol.* 222(4):967-972, 1972.

The lower esophageal sphincter responds to various hormones and drugs. The effect of a cholinergic agent on this sphincter has been tested. Pressure in the lower esophageal sphincter was monitored continuously in fasting subjects using an infused recording system. After a 15-min basal period, Urecholine (bethanechol), 5 mg s.c. was given, and pressure was monitored for an additional 60 min. In 11 normal subjects with mean basal lower esophageal sphincter pressure of 14.6 ± 1.3 mm Hg pressure increased after Urecholine injection to a peak of 31.5 ± 5.3 mm Hg. In 11 patients with symptomatic incompetence of the lower esophageal sphincter, pressure increased from a mean basal level of 4.3 ± 0.5 to a peak of 19.6 ± 2.4 mm Hg. The sphincter response to Urecholine in normal subjects could not be augmented by either pentagastrin or stimulation of endogenous gastrin by gastric alkalinization. However, both secretin injection and gastric acidification inhibited the pressure response to Urecholine. Urecholine increases lower esophageal sphincter pressure in normal subjects and patients with sphincter incompetence. This response is apparently mediated, at least partially, through release of endogenous gastrin.

0979 AMPLITUDE OF ESOPHAGEAL PERISTALSIS AS DETERMINED BY RAPID INFUSION. *(E.)* Hollis, J. B.; Castell, D. L. (U.S. Naval Hosp. Philadelphia, Pa.). *Gastroenterology* 63(3):417-422, 1972.

Subjects (24 in number aged 19-38 yr old) with no history of dysphagia or chronic heartburn were used to evaluate the effect of increasing infusion rates on measurement of amplitude of esophageal contractions after a minimum 4-hr fast. A new method was used to measure amplitude of esophageal peristalsis. In normal subjects a triple lumen polyvinyl catheter connected to external transducers measured amplitude after 5-ml swallows with infusion rates from 1-23 ml/min. A hyperbolic pressure response curve was obtained to increasing infusion rate. Linear transformation of this curve, using a reciprocal plot, allowed calculation of the maximal amplitude. This calculated maximal response was obtained for each of the normal subjects at points 5 and 10 cm above the lower esophageal sphincter. The calculated maximal response values ranged from 54-254 mm Hg, but were quite reproducible. Esophageal amplitude measured directly with the new Honeywell intraesophageal transducer confirmed the high values obtained with rapid infusion speed. There was high correlation in all subjects studied between the calculated maximal response value and peristaltic amplitude measured directly when these two systems were used simultaneously.

0980 INTESTINAL MOTILITY. I. CONTROL MECHANISMS IN THE BASIC ELECTRIC RHYTHM OF THE CANINE SMALL INTESTINE. *(E.)* Hiatt, R. B.; Goodman, I.; Overweg, N. I. A. (Coll. Phys. Surg., Columbia Univ., New York, N.Y.). *J. Surg. Res.* 11(9):454-463, 1971.

In 3 fasting dogs with Biebl loops consisting of the duodenum, jejunum, and ileum, resp., the pacesetter potential of the basic electric rhythm has a varied, rapidly changeable pattern. A polypeptide extractable from the bovine posterior pituitary, when given i.v., has the capacity to change the varied pacesetter potential pattern in the fasting dog to that of a highly organized cephalocaudad coherent pattern. This polypeptide has tenatively been named Coherin. Serotonin, when instilled intraluminally in a dog pretreated with Coherin i.v., has the capacity of making the pacesetter potentials simultaneous in a particular segment of small intestine. This observable pacesetter potential performance appears to preclude an anatomically stable focal pacemaker apparatus. An alternative model is proposed comprised of a linear intramural pacing apparatus demonstrable in the form of an electropositive beat and involving varying lengths of intestine, depending on physiological stimulus.

0981 EFFECT OF MORPHINE, CHOLECYSTOKININ AND SYMPATHOMIMETICS OF THE SPHINCTER OF ODDI AND INTRAMURAL PRESSURE IN CAT DUODENUM. *(E.)* Persson, C. G. A.; Ekman, M. (Res. Lab. AB Draco, Lund, Sweden). *Scand. J. Gastroenterol.* 7(4):345-351, 1972.

Intramural pressure in the cat duodenum has been recorded by perfusion of pieces of femoral vein introduced through the duodenal wall. Simultaneously, passage pressure through the sphincter of Oddi and intraluminal pressure in the duodenum were recorded. Morphine (1-4μg/kg) increases all pressures. Norephinephrine (1-4μg/kg) inhibits intestinal activity but contracts the sphincter of Oddi. Isoprenaline (0.2-1μg/kg and terbutaline (2-10μg/kg) decrease all pressures. Cholecystokinin (1-4 I.U./kg) relaxes the sphincter of Oddi and the duodenum surrounding the sphincter, but tends to contract more distal parts of duodenum. Given together with morphine, the qualitative effects of these agents are the same. Combination of morphine and norepinephrine shows that morphine induces contraction of the muscle of the sphincter of Oddi and of the intestine.

0982 A PHARMACOLOGIC ANALYSIS OF THE GASTROILEAL AND GASTROCOLIC REFLEXES IN THE DOG. *(E.)* Tansy, M. F., Kendall, F. M.; Murphy, J. J. (Temple Univ. Sch. Dentistry, Philadelphia, Pa.). *Surg. Gynecol. Obstet.* 135(5):763-768, 1972.

The properties of the efferent pathways involved in vagosympathetic reflexes were investigated in 16 adult mongrel dogs of both sexes in a postabsorptive state and under chloralase-urethan anesthesia. The influence of central vagal stimulation on smooth muscle activity of the small intestine is both excitative and inhibitory, the inhibitory effects predominating. The ileum receives a dual adrenergic and cholinergic motor innervation in its splanchnic nerve supply. The lumbar sympathetic supply to the proximal part of the colon in the dog also can be reflexly excited by vagal afferents. The lumbar sympathetic outflow is mainly inhibitory in its action on colonic motility. After vagectomy in the dog, a pronounced segmenting response of the ascending colon, however, is produced by epinephrine.

This effect persists after atropinization, thereby indicating that the ascending colon is responsive to adrenergic excitatory effects. The excitatory vagosympathetic segmenting and propulsive responses of the ascending colon are blocked by atropine and enhanced by reserpinization. The lumbar sympathetic outflow also contains cholinergic fibers. These findings suggest the existence of a nervous basis for the gastrocolic propulsive response.

0983 DIGESTA FLOW THROUGH THE RABBIT LARGE INTESTINE. *(E.)* Pickard, D. W.; Stevens, C. E. (New York State Vet. Coll., Cornell Univ., Ithaca, N.Y.). *Am. J. Physiol.* 222(5):1161-1166, 1972.

0984 FUNCTIONS OF NEURONS IN ENTERIC PLEXUSES OF CAT INTESTINE. *(E.)* Ohkawa, H.; Prosser, C. L. (Dept. Physiol., Univ. Illinois, Urbana). *Am. J. Physiol.* 222(6):1420-1426, 1972.

0985 THE HYPERTENSIVE GASTROESOPHAGEAL SPHINCTER: A MANOMETRIC AND CLINICAL STUDY. *(E.)* Pedersen, S. A.; Alstrup, P. (Odense Univ. Hosp., Denmark). *Scand. J. Gastroenterol.* 7(6):531-534, 1972.

0986 THE INFLUENCE OF ORAL METOCLOPRAMIDE ON GASTRIC EMPTYING AFTER A FIXED WATER LOAD. *(E.)* Kreel, L.; Trott, M.; Howells, T. H. (Roy. Free Hosp., London, England). *Clin. Radiol.* 23(21): 213-218, 1972.

0987 ORIGIN, TRANSMISSION AND IONIC DEPENDENCE OF COLONIC ELECTRICAL SLOW WAVES. *(E.)* Caprilli, R.; Onori, L. (Med. Clin. II, Univ. Rome, Italy). *Scand. J. Gastroenterol.* 7(1):65-74, 1972.

0988 GLUCOCORTICOID INFLUENCE ON SERUM CALCIUM AND GASTROINTESTINAL MOTILITY IN RATS WITH VARIED PARATHYROID FUNCTION. *(E.)* Segerstrom, A.; Ohrn, P. G. (Univ. Hosp., Uppsala, Sweden). *Scand. J. Gastroenterol.* 7(2):185-192, 1972.

0989 STUDIES OF GASTROINTESTINAL INTERACTIONS. *(E.)* Johansson, C.; Ekelund, K.; Kulsdom, N.; Larsson, I.; Lagerlof, H. O. (Med. Dept. Karolinska Hosp., Karolinska Inst. Stockholm, Sweden). *Scand. J. Gastroenterol.* 7(4):391-393, 1972.

0990 MOTOR DYSFUNCTION OF THE GASTROINTESTINAL TRACT. *(E.)* Seaman, W. B. (Presbyterian Hosp., New York, N.Y.). *Am. J. Roentgenol. Radium Ther. Nucl. Med.* 116(2):235-244, 1972.

0991 DIFFERENTIAL SENSITIVITY OF THE HUMAN ESOPHAGUS TO PENTAGASTRIN. *(E.)* Hollis, J. B.; Levine, S. M.; Castell, D. O. (U.S. Naval Hosp., Philadelphia, Pa.). *Am. J. Physiol.* 222(4): 870-874, 1972.

0992 DIFENOXINE (R15403), THE ACTIVE METABOLITE OF DIPHENOXYLATE (R1132). PART 3: INHIBITION OF THE PERISTALTIC ACTIVITY OF THE GUINEA PIG ILEUM IN VITRO. *(E.)* Van Nueten, J. M.; Janssen, P. A. J. (Janssen Pharm., Res. Lab., Beerse, Belgium). *Arzneim. Forsch.* 22(3):518-520, 1972.

See also, 1192, 1547, 1548, 1942

SECRETION AND METABOLISM

993 PENTAGASTRIN-STIMULATED INCORPORATION OF ^{14}C-OROTIC ACID INTO RNA OF GASTRIC AND UODENAL MUCOSA. *(E.)* Chandler, A. M.; Johnson, . R. (Univ. Oklahoma Health Sci. Ctr., Oklahoma ity). *Proc. Soc. Exp. Biol. Med.* 141(1):110-113, 972.

See also, 0929

0994 ADENOSINE 3',5'-MONOPHOSPHATE (CYCLIC AMP) AND SECRETION IN THE CANINE STOMACH. *(E.)*

Mao, C. C.; Shanbour, L. L.; Hodgins, D. S.; Jacobson, E. D. (Dept. Physiol. Biophys., Univ. Oklahoma Med. Ctr., Oklahoma City, Oklahoma). *Gastroenterology* 63(3):427-438, 1972.

The role of cyclic adenosine monophosphate (cyclic AMP) in canine stomach gastric secretion has been evaluated by inhibiting cyclic nucleotide phosphodiesterase which degrades cyclic AMP; by determining the effect of histamine, on activity of adenyl cyclase; and by administering to the stomach a derivative of cyclic AMP which often elicits physiological responses more readily in intact tissue than cyclic AMP. Theophylline inhibited phosphodiesterase (PDase) activity *in vitro*. This effect was most pronounced (from 0% to 30%) when drug concentration increased from 0 to 1.56mM. At 12.5mM theophylline inhibited PDase activity 50%. Papaverine appeared 20 times as effective as theophylline, inhibiting PDase activity 90% *in vitro* at 1.25 mM. Neither agent initiated gastric secretion in the anesthetized dog stomach. PDase activity was not significantly altered by *in vivo* administration of either of the drugs. Histamine in the range studied, did not increase gastric mucosal adenyl cyclase activity *in vitro*, and histamine in a dose (30 µg per kg-hr) which stimulated acid secretion from the anesthetized dog stomach did not increase mucosal adenyl cyclase activity *in vivo*. When enzyme preparations from 3 of 4 control biopsies were assayed in the presence of 10^{-2}M NaF, a large increase in all activities was measured (44.7± 2.5 pmols/mg) indicating that canine mucosal adenyl cyclase was activated by fluoride *in vitro* but not by doses of histamine *in vivo* which stimulated secretion. Dibutyryl cyclic AMP (0.1 and 0.2 mg/kg-min) infused i.a. into a gastric artery for 60 min increased blood flow to the stomach segment, but did not initiate gastric secretion nor alter arterial blood pressure. These results suggest that initiation of secretion in the canine stomach does not depend upon accumulation of cyclic AMP.

0995 THE INFLUENCE OF CAERULEIN ANALOGUES ON GASTRIC ACID SECRETION AND PEPTIC ULCER PRODUCTION IN CAT. *(E.)*

Konturek, S. J.; Radecki, R.; Biernat, J.; Thor, P. (Med. Acad., Krakow, Poland). *Acta Med. Pol.* 12(4):471-485, 1971.

Natural cerulein and three synthetic cerulein-like peptides, infused i.v., strongly stimulated gastric acid secretion and reduced the incidence and severity of pentagastrin- or histamine-induced peptic ulcers in cats with chronic gastric fistulas. The following dose ranges were employed: pentagastrin, 1-9µg/kg-hr; natural cerulein and synthetic ceruleins, 0.1-6.4µg/kg-hr; histamine, 40-320µg/kg-hr. The maximal acid output occurred at the dosage of 1.6µg/kg-hr with natural cerulein, while synthetic analogs were less effective. Augmentation of gastric acid secretion with a combination of ceruleins and histamine, as compared with histamine alone, was significant with all dose levels of histamine. However, the maximum reached by these combinations was not significantly higher than the maximum achieved with natural cerulein alone. In peptic ulcer experiments, administration of natural cerulein at 0.8µg/kg-hr induced peptic ulcers in 5 of 10 cats (mean ulcer area 23mm^2). Two of the analogs also produced ulcers in 5 of 8 and in 2 of 8 cats with mean areas of 33mm^2 and 42mm^2 resp. No ulcer complications occurred during infusion of ceruleins alone. Pentagastrin infusion (8µg/kg-hr) for 36 hr induced duodenal ulcers in 9 of 11 cats; in 4 cats the ulcers were deep and penetrated the duodenum wall, and in 2 others the duodenal wall was perforated. Natural cerulein (0.4µg/kg-hr) reduced the incidence to 3 of 13 cats, with small erosions occurring in 5 others. Synthetic ceruleins likewise reduced the incidence and severity of ulcers. Histamine infusion (160µg/kg-hr) for 36 hr induced peptic ulcers in 10 of 12 cats, with perforation of peptic ulcers occurring in 2 and a large gastric ulcer in 1. All others had multiple erosions and peptic ulcers appearing in the duodenum. Natural cerulein added at 0.8µg/kg-hr reduced the incidence to 4 of 10 cats and reduced the mean area; in 2 cats duodenal ulcers perforated. Analogs acted similarly. It is noted that the two synthetic cerulein-like peptides which most effectively resembled natural cerulein in peptic ulcer prevention each had a sulfated tyrosyl residue at the N-terminus of the heptapeptide.

0996 KINETICS OF ATROPINE INHIBITION OF HISTAMINE-STIMULATED GASTRIC SECRETION IN THE DOG. *(E.)*

Hirschowitz, B. I.; Hutchison, G.; Sachs, G. (Division Gastroenterology, Univ. Alabama, Birmingham). *Am. J. Physiol.* 222(5):1316-1321, 1972.

Five dogs with gastric cannulas and esophagostomies were studied at 7 doses of histamine (4-125 µg base/kg/hr) with and without a concomitant background infusion of atropine sulfate (10 µg/kg/hr). Each dose was administered for 4.5 hr and measurements were made of gastric juice volume, H, Cl, Na, K, and pepsin activity and the blood osmolality, H, Cl, Na, K, and hematocrit. Kinetic analysis of electrolyte output showed atropine to be a mixed but largely competitive inhibitor of histamine electrolyte stimulation. However, there was no fade or increase in the threshold dose nor was there delay in reaching peak output, suggesting that atropine may not be acting or occupying receptor sites and thereby preventing histamine from doing so. Concentrations of H^+ and Cl^- could also be analyzed by linear transformation which showed no change in peak volume output (V_{max}) but a significant increase in the histamine dose needed to give 50% of V_{max} (K_m). The pepsin output fell progressively as the histamine dose increased and H output rose, indicating that histamine inhibits pepsin output. Atropine caused additional inhibition of pepsin secretion. These findings suggest that hormone receptor mechanisms of the parietal cell may have common receptor sites for apparently disparate hormones and drugs.

0997 THE EFFECT OF VAGOTOMY ON THE LOWER PART OF THE ACID DOSE-RESPONSE CURVE TO PENTAGASTRIN IN MAN. *(E.)* Elder, J. B.; Gillespie, G.; Campbell, E. H. G.; Gillespie, I. E.; Crean, G. P. Kay, A. W. (Manchester Roy. Infirmary, England). *Clin. Sci.* 43(2):193-200, 1972.

Duodenal ulcer patients (47) were studied after truncal vagotomy and drainage (pyloroplasty in 26 and gastro-enterostomy in 21). Their acid secretory responses to insulin were classified according to the criteria of Hollander into two groups: positive (18) and negative (29). The acid response to small doses of pentagastrin (0.064-0.512 μg/hr/kg) was studied in these two groups. Of the 18 insulin-positive responses, 14 gave a positive acid response. In these 14 the dose-response pattern to pentagastrin was very similar to that in preoperative patients. With a negative acid response after insulin the dose-response curve to pentagastrin appeared to shift to the right. It had a lower level and a smaller slope. Truncal vagotomy caused an 8-fold increase in the threshold dose found in preoperative patients. Supersensitivity of the stomach to small doses of pentagastrin after vagotomy was not apparent.

0998 A STUDY OF THE ACID DOSE-RESPONSE CURVE TO SMALL DOSES OF PENTAGASTRIN IN DUODENAL ULCER PATIENTS. *(E.)* Elder, J. B.; Gillespie, G.; Campbell, E. H. G.; Gillespie, I. E.; Crean, G. P.; Kay, A. W. (Manchester Roy. Infirmary, England). *Clin. Sci.* 43(2):181-191, 1972.

The acid secretory responses to small doses of pentagastrin (0.008-0.064 μg/hr/kg) in 0.15M NaCl were studied in 31 patients (27 male and 4 female with a mean age of 44.8 yr) with symptomatic and radiological evidence of duodenal ulcer. Acid output increased significantly above basal values when 0.064 μg/hr/kg was administered. No significant increase in acid output occurred in control observations on 16 duodenal ulcer patients when the saline solvent alone was infused at the same rate. Considerable variation in acid response was noted between patients given the same body-weight dose of pentapeptide. Acid output was stimulated in 1 of 11 patients at a dose of 0.016 μg/hr/kg, in 11 of 27 at 0.032 μg/hr/kg, and in 15 of 27 at 0.064 μg/hr/kg. Under the conditions used in this study, 0.064 μg/hr/kg is the treshold for gastric acid secretion in preoperative duodenal ulcer patients and 0.008 μg/hr/kg appears to be subthreshold for most of these patients.

999 EFFECT OF SECRETIN ON CIRCULATING GASTRIN. *(E.)* Thompson, J. C.; Reeder, D. D.; unchman, H. H.; Becker, H. D.; Brandt, E. N. (Dept. urg., Univ. Texas Med. Br., Galveston, Tex.). *Ann. urg.* 176(3):384-393, 1972.

artially purified secretin and pure natural porcine ecretin were used to study the effect of secretin on asal and postprandial levels of serum gastrin in 12 ormal subjects, six patients with duodenal ulcer, and six patients with the Zollinger-Ellison syndrome. The effects of synthetic secretin on fasting gastrin levels was studied in four dogs. Partially purified secretin (8 Crick-Harper-Raper units/kg/hr) caused a rise in serum gastrin concentrations in two patients with the Zollinger-Ellison syndrome before gastrectomy and in six patients with the Zollinger-Ellison syndrome after total gastrectomy. Pure secretin (1 clinical U/kg) caused: (a) no change in the fasting levels of serum gastrin in 11 control subjects, (b) a decrease in fasting gastrin concentrations in five out of six duodenal ulcer patients tested, (c) an increase in fasting serum gastrin levels in all five postgastrectomy patients with the Zollinger-Ellison syndrome, (d) a decrease in the postprandial serum gastrin responses in all nine control subjects tested, (e) a decrease in the postprandial serum gastrin response in all six duodenal ulcer patients studied, and (f) an increase in the postprandial serum gastrin response in three out of five postgastrectomy patients with the Zollinger-Ellison syndrome. Synthetic secretin (1 clinical U/kg) caused a fall in fasting serum concentrations of gastrin in four adult mongrel dogs. Pure secretin did not change the serum concentration of calcium in any study. Fasting levels of gastrin and postprandial integrated gastrin responses were higher in duodenal ulcer patients than in control subjects. The difference was not statistically significant. It is concluded that: (a) secretin suppresses the release of gastrin in response to a meal in normal man and in patients with duodenal ulcer disease; (b) secretin releases gastrin from tumor tissue in some patients with the Zollinger-Ellison syndrome; and (c) the difference in the serum gastrin responses to secretin between duodenal ulcer patients and patients with the Zollinger-Ellison syndrome may be of diagnostic importance in atypical patients.

1000 RELATION BETWEEN STIMULATORY EFFECT ON GASTRIC ACID SECRETION AND ANTRAL ABSORPTION OF CHEMICAL COMPOUNDS. *(E.)* Elwin, C. E.; Andersson, S.; (Dept. Pharmacol., Karolinska Inst., Stockholm, Sweden). *Scand. J. Gastroenterol.* 7(3): 247-255, 1972.

Five Heidenhain and two Pavlov pouch dogs were used to study the influence of acidity variations within the isolated antrum on absorption and on gastrin release by one ionic (choline) and two nonionic compounds (ethanol, *n*-propanol). Absorption of ethanol and *n*-propanol was determined by measuring the concentration of the alcohols in the portal blood, in peripheral venous blood, and in the antrum. The absorption constants were identical for the two alcohols at pH 7. Even though gastrin release by both alcohols was inhibited at low pH levels (pH<2), the constants remained the same at pH 3 and pH 1 for ethanol and were only slightly decreased for *n*-propanol (instillation of 10% v/v solutions). Antral perfusion at various pH levels with graded concentrations (2, 4, and 8% solutions) of choline showed a significant increase of free plasma choline at pH 7 and a slight increase at pH 5 with 8% solutions, but no increase with 1-4% choline solutions of pH 7, 5, 3, or 1. Acid output during choline administration was inhibited at pH 5. Infusion of graded amounts of choline (0.1-0.8 g/hr i.v.) stimulated acid output of the fundic pouches at a threshold dose of 0.4 g/hr. Combined administration of the i.v. threshold dose and graded antral concentrations produced a synergistic action between released gastrin and increased plasma choline. The results suggest that more than one mechanism may be involved in inhibition of gastrin release by acid.

1001 EFFECT OF VAGOTOMY ON GASTRIN RELEASE DURING INSULIN HYPOGLYCAEMIA IN ULCER PATIENTS. *(E.)* Stadil, F. (Rigshospital, Copenhagen, Denmark). *Scand. J. Gastroenterol.* 7(3):225-231, 1972.

To confirm that the secretion of gastrin in response to insulin is caused by vagal release of gastrin, serum gastrin concentrations were determined by radioimmunoassay in unoperated and vagotomized ulcer patients. A moderate and sustained increase in serum gastrin concentrations was found in 23 unoperated patients (from a mean of 104 to a mean of 148 pg/ml serum), in 19 patients with a complete vagotomy (from a mean of 103 to a mean of 140 pg/ml serum), and in 25 patients with an incomplete vagotomy (from a mean of 127 to a mean of 178 pg/ml serum). The increase began 30 minutes after insulin injection (0.20 IU/kg i.v.) and lasted for more than 1.5 hr. Since a definite increase was demonstrated in all groups of patients, vagotomy does not abolish the gastrin response to insulin hypoglycaemia.

1002 CIRCADIAN SERUM GASTRIN CONCENTRATIONS IN CONTROL PERSONS AND IN PATIENTS WITH ULCER DISEASE. *(E.)* Feurle, G.; Ketterer, H.; Becker, H. D.; Creutzfeldt, W. (Dept. Med., Univ. Gottingen, Germany). *Scand. J. Gastroenterol.* 7(2):177-183, 1972.

Using a sensitive radioimmunoassay, circadian hourly serum gastrin levels were measured in 9 patients with duodenal ulcer, 8 patients with prepyloric ulcer, 8 patients with pyloric obstruction, 7 patients with peptic jejunal ulcer, and 11 controls. The nocturnal serum gastrin concentrations in patients with duodenal ulcer were significantly higher than those of the controls. Diurnal and nocturnal gastrin levels were elevated in patients with prepyloric ulcer. The serum gastrin levels were high in patients with gastric distension and low in patients with jejunal peptic ulceration after partial gastrectomy (Billroth II). Increased vagal activity and antral distension may induce high gastrin serum concentrations, but these findings support the hypothesis that an additional mechanical factor is involved in the elevated gastrin levels in ulcer patients.

1003 RATE AND PATTERN OF DISAPPEARANCE OF EXOGENOUS GASTRIN IN DOGS. *(E.)* Reeder, D. D.; Jackson, B. M.; Brandt, Jr., E. N.; Thompson, J. C. (Univ. Texas, Med. Br., Galveston, Texas). *Am. J. Physiol.* 222(6):1571-1574, 1972.

1004 EFFECTS OF β-ADRENERGIC RECEPTORS STIMULATION AND BLOCKADE ON GASTRIC ACID SECRETION IN PIGEONS. *(E.)* Geumei, A.; Issa, I.; Abd-el-Samie, Y. (Fac. Med., Alexandria Univ., Egypt). *Pharmacology* 7(1):29-35, 1972.

1005 PROSTAGLANDIN SYNTHETASE ACTIVITY IN THE RAT STOMACH FUNDUS: ACTIVATION BY L-NOREPINEPHRINE AND RELATED COMPOUNDS. *(E.)* Pace-Asciak, C. (Montreal Neurol. Inst., McGill Univ., Montreal, Canada). *Biochim. Biophys. Acta* 280(1):161-171, 1972.

1006 GASTRIC ACID SECRETION IN THE FERRET DURING ESTRUS AND ANESTRUS. *(E.)* Pfeiffer, C. J.; Peters, C. M. (Presbyterian-Univ. Pennsylvania Med. Ctr., Philadelphia, Pa.). *Digestion* 5(3/4):129-139, 1972.

1007 MATERIALS AND METHOD FOR STUDYING THE CHEMICAL PHASE OF HYDROCHLORIC ACID SECRETION ON GASTRIC MUCOSA PREPARATIONS. *(Rus.)* Pokrovskii, A. A.; Levin, L. G.; Gapparov, M. M. (Inst. Nutr., Moscow, USSR). *Vopr. Pitan.* (4):6-12, 1972.

1008 EFFECT OF DIETARY FACTORS ON GASTRIC FUNCTION AND GASTRIC CARCINOGENESIS. *(Rus.)* Arkhipov, G. N. (Inst. Nutr., Moscow, USSR). *Vopr. Pitan.* (4):43-48, 1972.

1009 GASTRIN AND ACID STUDIES IN THE POUCH DOG. II. EFFECT OF TRUNCAL VAGOTOMY ON RESPONSE TO FOOD AND INSULIN HYPOGLYCAEMIA. *(E.)* Korman, M. G.; Brough, B. J.; Hansky, J. (Prince Henry's Hosp., Melbourne, Australia). *Scand. J. Gastroenterol.* 7(6):525-529, 1972.

1010 EFFECT OF ANTRECTOMY ON THE RESPONSE OF STOMACH TO HISTAMINE AND PENTAGASTRIN IN RATS. *(E.)* Kowalewski, K.; Scharf, R. (Surg. Med. Res. Inst., Univ. Alberta, Edmonton, Canada). *Arch. Int. Physiol. Biochim.* 80:35-43, 1972.

1011 CYCLIC AMP AND GASTRIC SECRETION. *(E.)* Amer, M. S. (Mead Johnson Res. Ctr., Evansville, Ind.). *Am. J. Dig. Dis.* 17(10):945-953, 1972.

1012 THE RELATIONSHIP BETWEEN ACID, PEPSIN, AND ELECTROLYTES IN GASTRIC JUICE BEFORE AND AFTER SUBCUTANEOUS INJECTION OF HISTAMINE IN MAN. *(E.)* Semb, L. S. (Ulleval Hosp., Univ. Oslo, Norway). *Scand. J. Gastroenterol.* 7(1):17-21, 1972.

1013 PANCREATIC AND GASTRIC SECRETION IN RATS STUDIED BY MEANS OF DUODENAL AND GASTRIC PERFUSION. *(E.)* Schmidt, H. A.; Goebell, H.; Johannson, F. (Med. Clin., Univ. Marburg, Germany). *Scand. J. Gastroenterol.* 7(1):47-53, 1972.

1014 HISTOCHEMICAL STUDIES OF THE GASTRIC MUCOSA OF RATS BEFORE AND AFTER TRUNCAL VAGOTOMY. *(Ger.)* Petermann, J.; Lorenz, D.; Dorn, A. (Surg. Clin., Ernst Moritz Arndt Univ., Greifswald, Germany). *Acta Histochem. (Jena)* 43:71-82, 1972.

1015 GASTRIC AUTOANTIBODIES AND CELL-MEDIATED IMMUNITY IN PERNICIOUS ANAEMIA: A COMPARATIVE STUDY. *(E.)* Fixa, B.; Thiele, H. G.; Komarkova, O., Nozicka, Z. (Charles Univ. Med. Fac., Hradec Kralove, Czechoslovakia). *Scand. J. Gastroenterol.* 7(3):237-240, 1972.

1016 EFFECT OF SECRETIN ON METHYLXANTHINE (THEOPHYLLIN)-INDUCED STIMULATION OF ACID, ELECTROLYTE, AND PEPSINOGEN SECRETION IN THE HUMAN STOMACH. *(Ger.)* Deyhle, P.; Miederer, S. E.; Stadelmann, O. (Med. Clin., Univ. Erlangen-Nurnberg, Erlangen, Germany). *Klin. Wochenschr.* 49(22):1231-1234, 1971.

1017 LONG-TERM ACTION OF GLUCAGON ON GASTRIC SECRETION. *(Ger.)* Paul, F.; Deyhle, P. (Med. Clin., Univ. Erlangen-Nurnberg, Erlangen, Germany). *Klin. Wochenschr.* 49(22):1229-1231, 1971.

1018 THE ROLE OF THE SYMPATHETIC NERVOUS SYSTEM IN HYPOGLYCAEMIA-STIMULATED GASTRIC SECRETION. *(E.)* Hodge, A. J.; Masarei, J. R.; Catchpole, B. N. (Royal Perth Hosp., Australia). *Gut* 13(5):341-345, 1972.

1019 GASTRIN AND ACID STUDIES IN THE POUCH DOG. I. THE RESPONSE TO FOOD AND INSULIN HYPOGLYCAEMIA. *(E.)* Brough, B. J.; Korman, M. G.; Hansky, J. (Alfred Hosp., Melbourne, Australia). *Scand. J. Gastroenterol.* 7(6):519-523, 1972.

1020 GASTRIN: SITE OF SYNTHESIS, STRUCTURE, INACTIVATION, AND METABOLISM. *(Ger.)* Seelig, H. P. (Pathol. Inst., Free Univ., Berlin, Germany). *Dtsch. Med. Wochenschr.* 97(3):87-89, 1972.

1021 THE PEPTIDE FRACTION OF GASTRIC JUICE. A STUDY OF THE PEPTIDES OF GASTRIC JUICE IN NORMAL PATIENTS AND PATIENTS WITH PEPTIC ULCER, GASTRIC CARCINOMA AND PERNICIOUS ANAEMIA. *(E.)* Piper, D. W.; Fenton, B. H.; Croydon, M.; Clarke, A. D. (Dept. Med., Univ. Sydney, Australia). *Scand. J. Gastroenterol.* 7(2):113-118, 1972.

022 INHIBITION OF PEPTIC ACTIVITY IN MAN BY CARBENOXOLYNE SODIUM. *(E.)* Berstad, A. (Ulleval Hosp., Oslo, Norway). *Scand. J. Gastroenterol.* 7(2):129-135, 1972.

023 THE POTENCY OF GASTRIN AND RELATED PEPTIDES TO ENHANCE THE GASTRIC SECRETORY RESPONSE O SHAM FEEDING. *(E.)* Sjodin, L. (Karolinska Inst., Stockholm, Sweden). *Scand. J. Gastroenterol.* 7(2):145-149, 1972.

1024 INHIBITION OF GASTRIC SECRETION BY ACIDIFICATION OF THE DUODENAL BULB BEFORE AND AFTER TRANSECTION OF THE PYLORUS. *(E.)* Sjodin, L.; Anderson, S. (Karolinsk Inst., Stockholm, Sweden). *Scand. J. Gastroenterol.* 7(2):151-156, 1972.

1025 EFFECTS OF GASTRIN I, SECRETIN AND CHOLECYSTOKININ-PANCREOZYMIN ON THE ELECTRICAL ACTIVITY, MOTOR ACTIVITY, AND ACID OUTPUT OF THE STOMACH IN MAN. *(E.)* Kwong, N. K.; Brown, B. H.; Whittaker, G. E.; Duthie, H. L. (Dept. Surg., Univ. Sheffield, England). *Scand. J. Gastroenterol.* 7(2):161-170, 1972.

1026 THE EFFECT OF TETRAGASTRIN ON GASTRIC ACID SECRETION. REPRODUCIBILITY AND COMPARISON WITH THE PENTAGASTRIN TEST AND THE AUGMENTED HISTAMINE TEST. *(E.)* Hart Hansen, O.; Madsen, P. (Bispebjerg Hosp., Copenhagen, Denmark). *Scand. J. Gastroenterol.* 7(2):171-175, 1972.

1027 NOCTURNAL INTRAGASTRIC pH MEASUREMENTS. *(E.)* Clemencon, G. (Solothurnisches Kantonspital, Olten, Switzerland). *Scand. J. Gastroenterol.* 7(4):293-298, 1972.

1028 AUGMENTED HISTAMINE TEST IN DOGS: METHOD OF ASPIRATION TECHNIC. *(E.)* Aagaard, P.; Fischerman, K.; Funding, J. (Rigshospital, Copenhagen, Denmark). *Scand. J. Gastroenterol.* 7(3):279-282, 1972.

1029 CALCIUM-INDUCED GASTRIC HYPERSECRETION: LACK OF EFFECT OF ENDOGENOUS PARATHYROID HORMONE. *(E.)* Kaplan, E. L.; Hill, B. J.; Canterbury, J. M.; Reiss, E.; Peskin, G. W. (Dept. Surg., Univ. Chicago, Ill.). *J. Surg. Res.* 12(4):229-233, 1972.

1030 PARATHYROID ADENOMA AND GASTRIC ACID SECRETION. *(E.)* Christiansen, J.; Aagaard, P. (Rigshospital, Copenhagen, Denmark). *Scand. J. Gastroenterol.* 7(5):445-449, 1972.

1031 GASTRIC ACID SECRETION AND CHANGES IN BLOOD GLUCOSE AFTER INSULIN IN ANOTHER HEALTHY MAN. *(E.)* Cowley, D. J.; Baron, J. H. (Roy. Postgrad. Med. Sch., Hammersmith Hosp., London, England). *Scand. J. Gastroenterol.* 7(5):439-443, 1972.

See also, 0949, 0961, 1128, 1391, 1393, 1892

1032 AMYLASE SECRETION FROM MOUSE PAROTID AND PANCREAS: ROLE OF CYCLIC AMP AND ISOPROTERENOL.

(E.) Malamud, D. (Massachusetts Gen. Hosp., Boston). *Biochim. Biophys. Acta* 279(2):373-376, 1972.

Isoproterenol (8.3 mg/kg) injected s.c. in male Charles River mice effectively depleted parotid amylase within 2 hr, while 12 times that amount did not decrease pancreatic enzyme activity. In both tissues dibutyryl cyclic AMP decreased amylase activity. Theophylline decreased parotid amylase activity and, if given 30 min prior to isoproterenol, potentiated its effect on parotid amylase depletion, but it had no effect on pancreatic amylase. Propranolol blocked the depletion of parotid amylase after isoproterenol injection, whereas phentolamine did not. These agents, alone or with isoproterenol, did not affect pancreatic amylase activity. An enzyme preparation from both tissues responded to isoproterenol, with pancreatic adenyl cyclase demonstrating a greater stimulation. *In vivo* studies showed that cyclic AMP levels increased in all tissues, with a peak level at 15-20 min after isoproterenol injection. The tissues of the parotid gland responded more than those of the pancreas, liver, kidney, or heart. Secretion from both parotid and pancreas must involve cyclic AMP. However, the tissue levels of cyclic AMP in the pancreas are not high enough to evoke amylase secretion after isoproterenol administration. Since the basal levels of cyclic AMP in the 2 tissues is the same, while the activity of pancreatic adenyl cyclase is only 10% of that of parotid preparations, the control mechanism involved in amylase secretion may involve a coordinated monitoring for both adenyl cyclase and phosphodiesterase.

1033 THE ACTIONS OF DIBUTYRYL CYCLIC ADENOSINE 3',5'-MONOPHOSPHATE AND METHYL XANTHINES ON PANCREATIC EXOCRINE SECRETION.

(E.) Case, R. M.; Scratcherd, T. (Univ. Med. Sch., Newcastle Upon Tyne, England). *J. Physiol. (Lond.)* 223:649-667, 1972.

The effects of exogenous N^6-2'-O-dibutyryl adenosine 3',5'-monophosphate (dibutyryl cyclic AMP) and of methyl xanthines on exocrine secretion from the isolated cat pancreas, at rest and during stimulation with secretin and pancreozymin, were studied to assess the importance of cyclic AMP as an intermediate in the actions of these hormones. Dibutyryl cyclic AMP (10mM) elicited the secretion of water and electrolytes, but not of enzymes. The composition of this secretion was the same as that secreted in response to secretin. This response could be slightly potentiated by theophylline, (0.5mM) which alone was barely capable of stimulating secretion. Theophylline, theobromine, and caffeine all markedly potentiated submaximal secretin stimulation. The relative effectiveness of these 3 drugs, if theophylline is assigned an arbitrary designation of 1.0, was in the ratio of 1.0:0.39:0.35 resp. At high concentration (>5mM) theophylline had 2 effects: initiating electrolyte and water secretion alone (while having only a small stimulatory effect on enzyme secretion) and inhibiting secretion stimulated maximally by secretin. In 3 of 4 experiments, 5mM theophylline caused slight potentiation of submaximal pancreozymin stimulation. This suggests that action of secretin, but not that of pancreozymin, may be mediated through cyclic AMP.

1034 ROLE OF Ca^{2+} AND CYCLIC AMP IN PROTEIN SECRETION FROM RAT EXOCRINE PANCREAS.

(E.) Heisler, S.; Fast, D.; Tenenhouse, A. (Dept. Pharmacol. Therap., McGill Univ., Montreal, Canada). *Biochim. Biophys. Acta* 279(3):561-572, 1972.

A study was made of the role of Ca^{2+} in protein secretion from rat exocrine pancreas and the effect of cyclic AMP and its dibutyryl analog on the secretory process in female Wistar rats. Cyclic AMP did not stimulate protein release nor enhance the effect of carbachol. Theophylline and dibutyryl cyclic AMP were equally effective in stimulating protein release. The secretory response to an optimal concentration of carbachol was potentiated by dibutyryl cyclic AMP to an extent greater than the sum of the individual effects of the two agents. The nucleotide may stimulate rate limiting step(s) in the secretion process. The secretory effects of carbachol and dibutyryl cyclic AMP, alone or in combination were Ca^{2+} dependent. Mn^{2+} inhibited secretory response to carbachol and carbachol + dibutyryl cyclic AMP but did not significantly alter the response to the nucleotide alone. Repeated stimulation of pancreas fragments in the absence of Ca^{2+} led to a progressive decline in secretory response; the rate of decline was much more rapid when the stimulus was carbachol than when carbachol + dibutyryl cyclic AMP was used. The response to dibutyryl cyclic AMP alone was not affected by this procedure. Readdition of Ca^{2+} to the incubation medium after a period of stimulation in the absence of Ca^{2+} restored the response to carbachol + dibutyryl cyclic AMP but did not restore the response to carbachol alone. These data suggest that Ca^{2+} is essential for carbachol-stimulated protein secretion. Both extracellular and intracellular Ca^{2+} may be utilized, and this ion is a limiting factor in the secretion process. Dibutyryl cyclic AMP may potentiate the secretory effect of carbachol by its ability to mobilize and conserve intracellular Ca^{2+} for utilization in the secretion progess.

1035 HCO_3^--STIMULATED ATPase FROM MAMMALIAN PANCREAS: PROPERTIES AND ITS ARRANGEMENT WITH OTHER ENZYME ACTIVITIES.

(E.) Siman, B.; Thomas, L. (Max-Planck Inst. Biophys., Frankfurt, Germany). *Biochim. Biophys. Acta* 288(2):434-442, 1972.

The particulate membrane fraction containing HCO_3^--stimulated ATPase from cat pancreatic tissue was submitted to enzymatic and gel electrophoretic studies on the dependence of enzyme activity on external HCO_3^- and H^+ concentrations, different bivalent cations and nucleotides. The HCO_3^--stimulated hydrolysis of different trinucleotides decreases in the sequence ATP> guanosine triphosphate> inosine triphosphate> uridine triphosphate. No HCO_3^--stimulated dinucleotide or mononucleotide hydrolysis could be detected. Glucose 6-phosphate was inactive as substrate. Divalent cations as Co^{2+}, Mn^{2+}, Ca^{2+}, Cd^{2+}, Zn^{2+} can substitute for Mg^{2+} with different degrees of effectiveness; Mg^{2+} is the most effective. Maximal enzymatic activity was observed at molar ratios of ATP to Mg^{2+} of 1.0. The highest rate of HCO_3^--stimulated ATP hydrolysis was reached at a HCO_3^- concentration of 20mM. In addition to leucine aminopeptidase and alkaline phosphatase, the small membrane fragments contain acetazolamide-inhibitable carboxylic esterase and anion-stimulated ATPase activity. When electrophoresis was performed with acrylamide gel concentrations ranging from 4-6% and pH values from 9.5-8.0 results indicate these enzyme activities are localized in the same membrane fragment; separation from succinate dehydrogenase indicates that they are not of mitochondrial origin. Pancreatic HCO_3^--stimulated ATPase is arranged with other enzymes in a complex of about 100Å in size presumably derived from plasma membrane and resembling, in many chemical properties, microsomal ATPase from gastric mucosa.

1036 THE EFFECT OF PANCREOZYMIN AND ACETYLCHOLINE ON THE MEMBRANE POTENTIAL OF THE PANCREATIC ACINAR CELLS. *(E.)* Petersen, O. H.; Matthews, E. K. (Univ. Cambridge, Med. Sch., England). *Experientia* 28(9):1037-1038, 1972.

To compare the effects of acetylcholine (ACh) and pancreozymin (CCK-Pz) on the membrane potential of the pancreatic acinar cells, a Krebs-Henseleit solution was perfused through excised mice pancreas. Both ACh and CCK-Pz temporarily depolarized the membrane. The time course and magnitude of the effects were similar. When cells were depolarized by a maximal dose of ACh, stimulation with a maximal dose of CCK-Pz did not produce any more depolarization. In the presence of atropine CCK-Pz, but not ACh, still depolarized the cell membrane. Epinephrine, norepinephrine, cyclic AMP, and dibutyrylcyclic AMP had no effect on membrane potential. Depolarization of the acinar cell membrane with a modified Krebs solution (increased K^+ content and reduced Ca^{2+} concentration with the same osmolarity) was independent of the presence of atropine. It is suggested that membrane depolarization, or the underlying permeability change, is the first step leading to extrusion of proteins into the acinar lumen; the presence of extracellular Ca^{2+} is also necessary.

1037 INHIBITION OF PANCREATIC SECRETION IN MAN BY CIGARETTE SMOKING. *(E.)* Bynum, T. E.; Solomon, T. E.; Johnson, L. R.; Jacobson, E. D. (Baylor Coll. Med., Texas Med. Ctr., Houston). *Gut* 13(5):361-365, 1972.

In 23 young normal subjects single or double secretin tests were performed during non-smoking and smoking periods. Of these 23, 5 served as a control group (non-smokers), 9 were classified as light smokers (less than 1 pack/day for less than 3 yr), and 9 as heavy smokers (more than 1 pack/day for more than 3 yr). Age ranged from 15-37 yr. No subject had evidence of previous pulmonary, cardiovascular, or gastrointestinal disorders. Pancreatic secretion tests run on light smokers during non-smoking periods were not significantly different from values obtained in the control group. However, smoking significantly inhibited the volume of pancreatic secretion and bicarbonate output. Heavy smokers exhibited chronically depressed pancreatic responses to secretin during non-smoking periods when compared to controls. During smoking periods no further inhibition of pancreatic secretion occurred. Amylase levels in duodenal specimens after secretin administration were not consistently or significantly altered by smoking.

1038 TRYPSINS IN HUMAN PANCREATIC JUICE: THEIR DISTRIBUTION AS FOUND IN 34 SPECIMENS. TWO HUMAN TRYPSINOGENS. *(E.)* Robinson, L. A.; Kim, W. J.; White, T. T.; Hadorn, B. (Univ. Washington Sch. Med., Seattle). *Scand. J. Gastroenterol.* 7(1):43-45, 1972.

1039 STIMULATION OF PANCREATIC AMYLASE SECRETION AND PROTEIN SYNTHESIS BY INSULIN. *(E.)* Couture, Y.; Dunnigan, J.; Morisset, J. (Univ. Sherbrooke, P. Quebec, Canada). *Scand. J. Gastroenterol.* 7(3):257-263, 1972.

1040 COMPARISON OF RESPONSE TO INTRAVENOUS INJECTION AND INFUSION OF SECRETIN IN MAN. *(E.)* Petersen, H.; Berstad, A. (Ulleval Hosp., Oslo, Norway). *Scand. J. Gastroenterol.* 7(5):463-469, 1972.

1041 PROGRESS REPORT: THE INTERRELATIONSHIPS OF THE PANCREATIC ENZYMES. *(E.)* Wormsley, K. G.; Goldberg, D. M. (Maryfield Hosp., Dundee, Scotland). *Gut* 13(5):398-412, 1972.

1042 EFFECTS OF FASTING, FEEDING, AND BETHANECHOL CHLORIDE ON PANCREATIC MICROSOMAL PROTEIN SYNTHESIS *IN VITRO*. *(E.)* Morisset, J. A.; Black, Jr., O.; Webster, P. D. (VA Hosp., Augusta, Georgia). *Proc. Soc. Exp. Biol. Med.* 140(4):1308-1314, 1972.

1043 CHANGES WITH FASTING IN PIGEON PANCREAS ALKALINE AND ACID RIBONUCLEASE. *(E.)* Morisset, J. A.; Black, O.; Webster, P. D. (VA Hosp., Augusta, Ga.). *Proc. Soc. Exp. Biol. Med.*, 139(2):562-564, 1972.

1044 THE ROLE OF INSULIN IN THE REGULATION OF α-AMYLASE SYNTHESIS IN THE RAT PANCREAS. *(E.)* Soling, H. D.; Unger, K. O. (Med. Clin., Univ. Gottingen, Germany). *Eur. J. Clin. Invest.* 2(4):199-212, 1972.

1045 COMPARISON OF D- AND L-PHENYLALANINE AS PANCREATIC STIMULANTS. *(E.)* Meyer, J. H.; Grossman, M. I. (VA Ctr., Los Angeles, Calif.). *Am. J. Physiol.* 222(4):1058-1063, 1972.

1046 HUMAN PANCREATIC ENZYMES: PROPERTIES OF TWO MINOR FORMS OF CHYMOTRYPSIN. *(E.)* Coan, M. H.; Travis, J. (Dept. Biochem., Univ. Georgia, Athens). *Biochim. Biophys. Acta* 268:207-211, 1972.

1047 INFLUENCE OF ANAESTHETIC DRUGS ON AMINO ACID INCORPORATION IN THE RAT PANCREAS. *(E.)* Kramer, M. F.; Poort, C. (Sch. Med., Univ. Utrecht, Netherlands). *Biochem. Pharmacol.* 21(4): 441-447, 1972.

1048 TECHNIQUE OF CANINE PANCREATIC ALLOTRANSPLANTATION. *(E.)* Kapur, B. M. L.; Balakrishna Rao, B. N.; Sarangee, R. K. (All-India Inst. Med. Sci., New Delhi). *Indian J. Med. Res.* 59(11):1771-1778, 1971.

1049 ENZYMATIC STUDIES OF GLUCOSE PHOSPHORYLATION IN THE GLUCAGON-PRODUCING CELLS OF DUCK PANCREAS. *(E.)* Lundqvist, G. (Histol. Dept., Univ. Uppsala, Sweden). *Horm. Metab. Res.* 4(2):83-86, 1972.

1050 EFFECT OF FAT LEVEL IN ISONITROGENOUS DIETS ON THE COMPOSITION OF AVIAN PANCREATIC JUICE. *(E.)* Hulan, H. W.; Bird, F. H. (Plant Prod. Div., Canada Dept. Agr., Ottawa, Canada). *J. Nutr.* 102(4):459-468, 1972.

See also, 0965, 1013, 1395, 1397, 1447, 1635, 1656
1657, 1658

SECRETION AND METABOLISM

Hepatobiliary Tract

1051 THE EFFECT OF TETRACYCLINE ON THE HEPATIC SECRETION OF TRIGLYCERIDE. *(E.)* Breen, K.; Schenker, S.; Heimberg, M. (Vanderbilt Univ. Sch. Med., Nashville, Tenn.). *Biochim. Biophys. Acta* 270(1):74-80, 1972.

The effect of i.v. tetracycline hydrochloride (100 mg/kg) on the subsequently isolated perfused rat liver was observed. This dose of tetracycline produced a 67% increase in hepatic triglyceride content in 3 hr *in vivo*. The hepatic content of phospholipid and cholesterol was unaltered, but cholesteryl esters increased moderately. This increase was significant only in female rats. Serum free fatty acids remained unchanged, while in male rats the serum triglyceride content diminished somewhat. The secretion of triglyceride by livers removed at 3 hr and perfused *in vitro* was lower than in livers from control rats. This effect was accompanied by diminished secretion of very low density lipoprotein and by excessive accumulation of triglyceride by perfused livers from tetracycline-treated rats. In rats treated i.v. with Triton WR-1339 (20/mg/kg) 30 min after tetracycline administration, Triton-induced hypertriglyceridemia was reduced. *In vitro* experiments suggest that tetracycline causes fatty liver by inhibiting hepatic mechanisms for triglyceride secretion.

1052 PROPIOMAZINE PROTECTION IN CCl_4 HEPATIC INJURY: AN ELECTRON MICROSCOPIC STUDY. *(E.)* Sarphie, T. G.; Lockard, V. G.; Arhelger, R. B.; Brunson, J. G.; Wilson, E. R. (Univ. Mississippi Med. Ctr., Jackson). *Lab. Invest.* 26(6):648-656, 1972.

Male albino Sprague-Dawley rats were studied to evaluate the effects of propiomazine on severe liver changes caused by p.o. administration of CCl_4. Each test grouping consisted of 4 animals. Animals were intubated for administration of CCl_4 and mineral oil solution in equal parts. The CCl_4-treated controls received 1 ml/kg. Other animals, in addition to the CCl_4 were given 25 mg/kg of propiomazine i.p. 0 and 3 hr after CCl_4 and were sacrificed 6, 12, or 24 hr later. Livers remained unchanged in animals given only propiomazine. At 6 hr hepatocyte changes in animals receiving CCl_4 included dilation, scattering, and vesiculation of the endoplasmic reticulum (ER); mitochondria appeared normal. Hepatocytes of animals receiving the drug combination demonstrated normal rough ER but the mitochondria were normal. After 12 hr cellular organelles in the CCl_4 rats were disrupted with extensive cytoplasmic vacuolation; mitochondria were of normal appearance. Sinusoidal endothelium was stripped away. In the drug combination group at 12 hr the ER was orderly, mitochondria were normal, but there was increased fat content.

Sinusoidal endothelium appeared normal. After 24 hr surviving cells from CCl_4 control animals showed enlarged mitochondria and ER dilation. At 24 hr animals receiving the drug combination had focal areas of centrilobular necrosis and increased fat content.

1053 DIURNAL VARIATION IN THE ACTIVITY OF CHOLESTEROL 7α-HYDROXYLASE IN THE LIVERS OF FED AND FASTED RATS. *(E.)* Mitropoulos, K. A.; Balasubramaniam, S.; Gibbons, G. F.; Reeves, B. E. A. (Hammersmith Hosp., London, England). *Fed. Eur. Biochem. Soc. Letters* 27(2):203-206, 1972.

Three groups of 3 male Wistar rats each were sacrificed every 4 hr and the cholesterol 7α-hydroxylase activity assayed in the microsomal preparation from the combined livers of each group. The activity of tyrosine transaminase was assayed in the soluble part of the same homogenates. The activity of cholesterol 7α-hydroxylase is maximal during the middle of the dark period, decreasing to a minimum at noon, and rising again in the evening; the activity of tyrosine transaminase undergoes similar changes. This rhythmic change is not due to changes in either the level of total liver microsomal cholesterol or in the size of the pool of microsomal cholesterol that acts as a substrate for cholesterol 7α-hydroxylase. Cholesterol 7α-hydroxylase activity exhibits a diurnal rhythm even during the fasting state, with the pattern of variation similar to fed rats, but with the minimum and maximum values of activity lower than in the fed state. There is a shift in the peak of maximum activity to the early part of the dark period. In rats receiving an i.p. injection of actinomycin D or cycloheximide at 7 p. m., the activity of cholesterol 7α-hydroxylase did not rise after 4 hr, whereas in control rats, activity was twice as high at 11 p. m. An increase in enzyme synthesis is responsible for the diurnal rise in cholesterol 7α-hydroxylase activity.

1054 HORMONAL CONTROL OF HEPATIC BILIRUBIN TRANSPORT AND CONJUGATION. *(E.)* Gartner, L. M.; Arias, I. M. (Albert Einstein Coll. Med., Bronx, N.Y.). *Am. J. Physiol.* 222(5):1091-1099, 1972.

The role of the pituitary and thyroid glands in the regulation of hepatic transport and metabolism of bilirubin was studied in 6-12 week old Sprague-Dawley rats, 27 hypophysectomized, 22 thyroidectomized, and 9 controls. Continuous bilirubin and bile collection were undertaken to estimate cumulative hepatic uptake and maximal hepatic excretion of bilirubin *in vivo* and determination of glucuronyltransferase activity *in vitro*. Maximal hepatic excretion of bilirubin was reduced to 40% of normal by 7-11 days after hypophysectomy and 34-36 days after thyroidectomy. Bile flow decreased 50% after hypophysectomy or thyroidectomy. The maximal concentration of bilirubin in bile was reduced. Cumulative hepatic uptake of bilirubin was probably unaffected by hypophysectomy, but may have been reduced by thyroidectomy. L-Thyroxine alone was capable of correcting the bilirubin transport defects in both groups of animals. Thyroid stimulating hormone also corrected the defect in hypophysectomized rats. Defective glucuronyltransferase activity was observed only when ortho-aminophenol served as the glucuronide receptor *in vitro*. Bilirubin glucuronide formation was either normal or increased following hypophysectomy or thyroidectomy. L-Thyroxine administration returned glucuronyltransferase activity to normal. Adrenocorticotropin gel, leuteotropic hormone, oxytocin, vasopressin, diethylstilbestrol, hydrocortisone, and protamine zinc insulin did not restore EM_B, bile flow, and bile bilirubin concentration in hypophysectomized rats. Corticosterone, adrenocorticotropin gel, diethylstilbestrol, procine growth hormone, oxytocin, and vasopressin did not increase ortho-aminophenol glucuronide formation in hypophysectomized rats.

1055 PROTEIN ARGININE BIOSYNTHESIS BY MAMMALIAN LIVER TISSUE DURING POSTNATAL DEVELOPMENT. *(E.)* Drotman, R. B.; Campbell, J. W. (Rice Univ., Houston, Texas). *Am. J. Physiol.* 222(5):1204-1212, 1972.

The incorporation of arginine into the total protein of thin liver slices was studied from shortly after birth to adulthood in the white rat. The source of arginine was either that supplied directly to the tissue (exogenous) or that synthesized from citrulline (endogenous). The rate of incorporation of both exogenous and endogenous arginine was high in the neonate and declined smoothly during postnatal development. Calculating the total incorporation of exogenous arginine/liver/hr in the newborn, this amounts to 13 nmol and in the 200g animal, to 29 nmol. The incorporation of endogenously synthesized arginine increases from around 4 nmol/liver/hr in the newborn to 29 nmol in the 200g animal, a 7-fold increase. This indicates that the capacity of liver for protein synthesis is high in the neonate, even though the normal supply of amino acids available to this organ *in vivo* may limit protein synthesis during early postnatal life. The ratio of incorporation of exogenous arginine/endogenous arginine is about 3 in the neonate, but declines to approximately 1 in the adult. The greater utilization of exogenous arginine during early postnatal life is consistent with the known nutritional requirement of arginine to sustain optimal growth during this period. The equal utilization of exogenous and endogenous arginine in the adult reflects the absence of a requirement for arginine for nitrogen balance at this stage.

1056 CONTROL OF GLUCONEOGENESIS IN LIVER. V. EFFECTS OF FASTING, DIABETES, AND GLUCAGON ON LACTATE AND ENDOGENOUS METABOLISM IN THE PERFUSED RAT LIVER. *(E.)* Exton, J. H.; Corbin, J. G.; Harper, S. C. (Vanderbilt Univ. Sch. Med., Nashville, Tenn.). *J. Biol. Chem.* 247(16):4996-5003, 1972.

The effects of glucagon, fasting, and diabetes on the flow of exogenous lactate or endogenous substrates into the pathways of gluconeogenesis, glycogenesis, ketogenesis, lipogenesis, and the Krebs cycle were studied on the perfused liver of male Sprague-Dawley rats. Glucose synthesis from lactate was enhanced in livers treated with glucagon or from fasted or diabetic rats. This increase was associated with increased lactate utilization and was not the result of inhibition of alternative pathways of lactate metabolism. The disposition of isotope between glucose and glycogen indicated impaired glycogen synthesis. The changes in glucose and glycogen synthesis in livers from diabetic rats were reversed by insulin treatment *in vivo*. The major product of lactate metabolism in livers from fed rats was CO_2; glucose was the major product in livers treated with glucagon or from fasted or diabetic rats. Ketone bodies, fatty acids, and cholesterol were minor products of lactate metabolism. Glucagon, fasting, and diabetes had negligible effects on lactate oxidation, but inhibited the synthesis of fatty acid and cholesterol. Fasting and diabetes also reduced lactate ketogenesis. Urea production was doubled by glucagon and diabetes, increased 30% by fasting, and minimally changed by lactate. The alterations in ureogenesis and indicated enhancement of gluconeogenesis from endogenous protein by glucagon, fasting, and diabetes. Ketone body production increased 10-fold in livers from fasted or diabetic rats perfused without lactate, apparently due to increased lipid utilization and decreased Krebs cycle activity. Glucagon produced a 2 fold increase in ketone bodies which suggested that these were mainly derived from protein. Lactate markedly suppressed ketogenesis and increased respiration in livers from fasted or diabetic rats due to an increase in the Krebs cycle. Lactate also replaced lipid as the major fuel oxidized by livers from fed rats, perhaps by diverting endogenous fatty acid from oxidation to esterification. Changes in the disposition of substrate (pyruvate or fatty acid) within the liver may be as important as changes in substrate supply in the alterations in gluconeogenesis and ketogenesis during fasting and diabetes.

1057 INCREASED BILIRUBIN CONJUGATION IN THE LIVER AND INTESTINAL MUCOSA OF PHENOBARBITAL TREATED RATS. *(E.)* Rodriguez Garay, E. A.; Morisoli, L. S.; del Rosario Spetale, M. (Natl. Univ., Rosario, Argentina). *Experientia* 28(8):944-946, 1972.

Phenobarbital increased the content of conjugated bilirubin in intestinal mucosa of Wistar and heterozygous Gunn rats infused i.v. with nonconjugated bilirubin. This effect was also observed after total hepatectomy. Wistar and heterozygous Gunn rats of both sexes were injected for 3 days with phenobarbital (100 mg/kg/day i.p.). Nonconjugated bilirubin was infused i.v. It was demonstrated that rat intestinal mucosa was able to conjugate bilirubin with glucuronic acid. Phenobarbital may increase the bilirubin-conjugating capacity of both the liver and intestinal mucosa in rats which are partially deficient in this respect. The failure of phenobarbital to increase conjugated bilirubin concentrations in the intestinal mucosa of homozygous Gunn rats and the correlation found between maximum biliary excretion of bilirubin and percentages of mucosa-conjugated bilirubin seem to confirm that glucuronide synthesis by the intestinal mucosa parallels the liver capacity. Wistar and heterozygous Gunn rats were also subjected to total hepatectomy, injected with nonconjugated ^{14}C-labeled bilirubin mixed with nonradioactive pigment (2 mg/100 g body weight i.v.) and sacrificed 30 min later. Some conjugated radioactive pigment was detected in the intestinal lumen, but the mechanism of transfer was not established.

1058 AUGMENTATION OF BILIRUBIN UDP GLUCURONYLTRANSFERASE ACTIVITY IN RAT LIVER HOMOGENATES BY GLUTETHIMIDE. *(E.)* Blaschke, T. F.; Berk, P. D.; Berlin, N. I. (Natl. Cancer Inst., Natl. Inst. Health, Bethesda, Md.). *Proc. Soc. Exp. Biol. Med.* 140(4):1315-1318, 1972.

Glutethimide was given i.p. to adult male Sprage-Dawley and Gunn rats at 50 or 75 mg/kg/day for 9-14 days, and proved as effective as phenobarbital in increasing the specific activity of hepatic bilirubin UDP-glucuronyltransferase activity in the Sprague-Dawley rats. However, the increase in liver size produced by phenobarbital was appreciably greater than that produced by glutethimide. Therefore, the enzyme activity produced by the latter was significantly less than phenobarbital produced when considered as milligrams bilirubin conjugated/hr/100 g body weight. The effect of glutethimide is dose-dependent and can be elicited by as little as 4 days of therapy. Both glutethimide and phenobarbital increased enzyme activity to normal levels in heterozygous Gunn rats, but failed to stimulate any activity in homozygous Gunn rats, who presumably lack the genetic capacity to synthesize this enzyme. Thus glutethimide, as well as phenobarbital, increased the capacity of the liver to form glucuronides. However, unless conjugation is rate-limiting, this dose not explain the increase in hepatic bilirubin clearance resulting from therapy with either drug.

1059 PARATHYROID HORMONE: A POSSIBLE INITIATOR OF LIVER REGENERATION. *(E.)* Rixon, R. H.; Whitfield, J. F.; Morton, H. J. (Natl. Res. Counc. Canada, Div. Biol. Sci., Ottawa). *Proc. Soc. Exp. Biol. Med.* 141(1):93-97, 1972.

Parathyroidectomy (PTX) was performed on male Sprague-Dawley rats. At various times blood was removed for calcium determinations. At 20-24 hr after PTX, the median and left lateral lobes of the liver were removed. The right lateral lobe was used to determine the mitotic activity of the parenchymal cells. The proportion of stimulated parenchymal cells synthesizing DNA rose to a peak value of 32.6% at 22 hr in control animals. After PTX the proportion rose more slowly and reached maximum of 15% at 36 hr after partial hepatectomy.

The cells entered mitosis 4-6 hr after synthesis began in both control and PTX animals, the mitotic fraction increasing to 4.0% at 28 hr after partial hepatectomy in controls and peaking at 2.0% after 40 hr in PTX animals. Partial hepatectomy, itself, induces an early, transient, hypocalcemia which precedes the initiation of DNA synthesis and cell proliferation. Thus, the parathyroid hormone might be a humoral agent involved in the initiation of hepatic regeneration. Since plasma calcium concentrations did not rise above normal in the parathyroid-intact, partially hepatectomized animals (an increase in extracellular calcium is needed for cell proliferation stimulation), it appears unlikely that calcium alone is the sole initiator of liver regeneration.

1060 DECREASE OF RAT LIVER GLUTAMATE DEHYDROGENASE AFTER CHRONIC ADMINISTRATION OF ETHANOL. *(E.)* Ideo, G.; de Franchis, R.; Del Ninno, E.; Dioguardi, N. (Ist. Patol. Spec. Med., Univ. Milan, Italy). *Enzymologia* 43(4):245-251, 1972.

The behavior of three mitochondrial enzymes, glutamate dehydrogenase, mitochondrial aspartate aminotransferase and mitochondrial malate dehydrogenase was studied in the serum and liver of 16 male Wistar rats treated with 3 g/kg/day ethanol which was diluted 40% (w/v) with physiological saline and administered by gastric intubation. Glutamate dehydrogenase activity was strikingly decreased in liver after chronic administration of ethanol, while mitochondrial aspartate aminotransferase and malate dehydrogenase were unaffected by the treatment. The decrease in glutamate dehydrogenase activity was not due to a specific release of this enzyme into the bloodstream, since the plasma levels of each of these three enzymes was not increased. A specific inactivation of glutamate dehydrogenase with NADH playing a major role is postulated as a cause of the decrease.

1061 LIVER REGENERATION AND HEPATIC COLLAGEN DEPOSITION IN RATS WITH DIMETHYLNITROSAMINE-INDUCED CIRRHOSIS. *(E.)* Haney, R.; Peacock, Jr., C. E.; Madden, J. W. (Univ. Arizona Coll. Med., Tucson). *Ann. Surg.* 175(6):863-869, 1972.

Hepatic regeneration following 70% amputation is significantly less in rats with dimethylnitrosamine (DMN)-induced cirrhosis than in pair-fed controls. Collagen concentrations in liver regenerate of cirrhotic and pair-fed control rats are less than in preamputation specimens. β-Aminopropionitrile (BAPN) during healing after DMN-induced cirrhosis ignificantly decreases collagen deposition. BAPN educes the amount of collagen in regenerated liver n cirrhotic and pair-fed control rats. Collagen eduction in regenerating rat liver does not esult in significant increase in dry weight, non-ollagenous protein, or mitotic activity.

062 STORAGE IRON KINETICS. II. THE UPTAKE OF HEMOGLOBIN IRON BY HEPATIC PARENCHYMAL ELLS. *(E.)* Hershko, C.; Cook, J. D.; Finch, C. A. (Univ. Washington Sch. Med., Seattle). *J. Lab. Clin. Med.* 80(5):624-634, 1972.

The hepatic uptake and cellular distribution of ^{59}Fe-labeled hemoglobin-haptoglobin (Hb-Hp), heme-hemopexin, and free hemoglobin were measured in female Wistar rats. Sixteen rats received an i.v. injection of Hb^{59}Fe-Hp, and groups of 4 animals were killed 20, 40, 60, and 120 min later. Liver radioactivity increased rapidly, peaking at 62% 60 min after injection. From 20-120 min intestinal activity rose from 4-8%. After 2 hr, 97.6% of hepatic ^{59}Fe was in the parenchymal cells. There was no evidence of radioiron transfer between parenchymal and reticuloendothelial cells in the 24 hr following the injection of labeled Hb-Hp. A reduction in hepatic uptake of Hb-Hp was caused by prior injection of either heme of free hemoglobin, indicating a competitive interaction, reinforcing the hypothesis that all 3 compounds are removed by the same cellular compartment.

1063 STORAGE IRON KINETICS. I. MEASUREMENT OF THE CELLULAR DISTRIBUTION OF ^{59}Fe IN RAT LIVER. *(E.)* Cook, J. D.; Hershko, C.; Finch, C. A. (Univ. Washington Sch. Med., Seattle). *J. Lab. Clin. Med.* 80(5):613-623, 1972.

Female Wistar rats were used to develop a quantitative method for determining the distribution of ^{59}Fe between parenchymal and reticuloendothelial (RE) cells in the liver of rats. RE activity was estimated from grain counts in autoradiographs of isolated Kupffer cells obtained after selective destruction of parenchymal cells by a proteolytic enzyme. These counts were related to the uptake of latex particles, and the ratio obtained was correlated for background activity and adjusted to a constant level of total liver activity. By comparing uptake of an unknown substance with an RE-localizing standard, the proportion of RE uptake may be estimated to an accuracy of between ± 9 to 16%, depending on the number of cells counted. This method should be useful in determining hepatic localization of any labeled complex, provided the same label can be given in a form which is rapidly removed by the hepatic RE cell.

1064 CITRULLINE METABOLISM IN THE PERFUSED RAT LIVER. *(E.)* Drotman, R. B.; Freedland, R. A. (Sch. Vet. Med., Univ. California, Davis). *Am. J. Physiol.* 222(4):973-975, 1972.

The ability of liver to synthesize citrulline was determined by *in situ* liver perfusion in male rats. The appearance of citrulline in the perfusate was followed after the addition of ornithine or proline. The rate of citrulline synthesis was studied in livers from rats treated in four different ways: (a) fed, (b) starved, (c) high protein, and (d) i.p. injections of exogenous hydrocortisone. Under all conditions the rate of appearance of citrulline in the perfusate was greatest when ornithine was added as the precursor, and there was a marked stimulation when 10 mM NH_4Cl were added to the perfusion media. Perfusion with arginine as the substrate resulted in both urea and citrulline in the perfusate, while the arginine disappeared at a slow but steady rate. Citrulline was formed by the liver and extruded into the perfusate, even in the presence of high levels of circulating citrulline. These results indicate that the liver is capable of synthesizing more citrulline than arginine, and therefore citrulline passes into the blood and can be used by other organs, such as the kidney, for arginine synthesis.

1065 DRUG-INDUCED PORPHYRIN BIOSYNTHESIS. IV. INVESTIGATION OF THE DIFFERENCES IN RESPONSE OF ISOLATED LIVER CELLS AND THE LIVER OF THE INTACT CHICK EMBRYO TO PORPHYRIA-INDUCING DRUGS. *(E.)* Racz, W. J.; Marks, G. S. (Dept. Pharmacol., Queen's Univ., Kingston, Ontario, Canada). *Biochem. Pharmacol.* 21(2):143-151, 1972.

3,5-Diethoxycarbonyl-2,4,6-trimethylpyridine (Ox-DDC) induces porphyrin biosynthesis in monolayer cultures of chick embryo liver cells, but not in the intact chick embryo while 3,5-diethoxycarbonyl-1,4-dihydro-2,4,6-trimethylpyridine DDC induces porphyrin biosynthesis in both systems. To investigate this finding ^{14}C-labeled Ox-DDC and ^{14}C-labeled DDC were prepared, injected into 17-day old white Leghorn chick embryos and the total amount of drug and metabolite(s) in the livers was measured at various times. Radioactivity after injection of ^{14}C-labeled Ox-DDC reached a maximum at 0.5 hr and then dropped rapidly. Radioactivity after injection of ^{14}C-labeled DDC reached maximum at 6 hr and remained elevated for a considerable time. The level of radioactivity from ^{14}C-labeled Ox-DDC was 5 times that of ^{14}C-labeled DDC. DDC caused a marked increase in δ-aminolevulinic acid synthetase activity, reaching maximum at 6 hr and remaining elevated at 24 hr, while Ox-DDC caused a considerably lower maximum in 4 hr and a return to control levels in 8 hr. Ox-DDC underwent a more rapid metabolic degradation in liver than DDC and its inactivity in the chick embryo was attributed to its rapid metabolic degradation. The fact that DDC causes porphyrin accumulation in chick embryo liver cells is due to the inability of the cells to metabolize the drug rapidly.

1066 EFFECT OF ACID-BASE ALTERATIONS ON HEPATIC LACTATE UTILIZATION. *(E.)* Goldstein, P. J.; Simmons, D. H.; Tashkin, D. P. (Sch. Med., Univ. California, Los Angeles). *J. Physiol.* 223(2):261-278, 1972.

Anesthetized, mechanically ventilated dogs were used to investigate the effect of acid-base changes on hepatic lactate utilization. Portal vein flow and hepatic artery flow were measured with electromagnetic flowmeters; lactate concentration of portal vein, arterial and mixed hepatic venous blood was determined by an enzymatic technique; and hepatic lactate uptake was calculated with the Fick principle. In 4 dogs respiratory alkalosis (Δ pH 0.25) resulted in a significant fall in total hepatic blood flow and a significant rise in both arterial lactate concentration and hepatic lactate utilization. In 4 dogs 0.6 M-tris buffer infusion (Δ pH 0.21) produced no significant changes in liver blood flow, arterial lactate concentration, or hepatic lactate uptake. In 6 dogs respiratory acidosis (Δ pH-0.20) produced no significant changes in liver blood flow, decreases in arterial lactate concentration (0.38 mM/l and 0.13 mM/l, resp.), and no significant changes in hepatic lactate uptake. A significant correlation was found between hepatic lactate utilization and arterial lactate concentration during the hyperlactatemia associated with respiratory alkalosis. Hyperlactatemia induced in 4 dogs by infusion of buffered sodium lactate (Δ pH 0.05; Δ liver blood flow 29%) was also significantly correlated with hepatic lactate utilization, and the slope of the regression was similar to that during respiratory alkalosis. The hyperlactatemia of alkalosis is not due to impaired hepatic utilization of lactate. The principal determinant of hepatic lactate uptake during alkalosis or lactate infusion is blood lactate concentration rather than liver blood flow or acid-base status.

1067 TESTING ON DI-L(+)-ORNITHINE-α-KETOGLUTARATE ON THE MODEL OF ISOLATED PERFUSED RAT LIVER. *(Ger.)* Roka, L. (Inst. Clin. Chem., Univ. Giessen, Germany). *Arzneim. Forsch.* 22(7):1103-1109, 1972.

Livers were removed from normal female Wistar rats and perfused with Krebs-Henseleit buffer to which the fluorinated hydrocarbon, FC 75, had been added as an oxygen carrier. The perfusate was then emulsified with ultrasound to produce a stable suspension with particles less than 5μ in diameter. Continuous infusion of ammonium chloride (0.75 or 1.87 mg/hr/g liver) and the liver-protective agent, di-L(+)-ornithine-α-ketoglutarate (DOKG; 0.5 mg/hr/g liver), significantly increased ammonium ion clearance from the perfusate and urea synthesis. Administration of galactosamine HCl (400 mg/kg i.p.) to rats 24 hr before removal of the liver reduced ammonium clearance and bile production, delayed BSP clearance, increased loss of K and cytosomal and mitochondrial liver enzymes, and resulted in an inability to regulate the glucose level of the perfusate. Infusion of DOKG (0.5 mg/hr/g liver) into the perfusate maintained the glucose level at 50 mg/100 ml (about half the normal value), improved BSP clearance and ammonium uptake, and reduced the loss of K and level enzymes, although it had no effect on urea synthesis or bile production. Larger and smaller amounts of DOKG (0.25 and 0.75 mg/hr/g liver) were not as effective. Addition of glucose (100 mg/hr) to the perfusate for galactosamine-damaged liver improved liver function, but addition of DOKG (0.5 mg/hr/g liver) was even more effective in improving ammonium ion clearance of the perfusate and urea synthesis. Improvement was not as pronounced when both glucose and DOKG were added to the perfusate. When rats were pretreated with DOKG (160 or 320 mg/kg i.p. x 4) 27, 19, 11, and 3 hr before removal of the liver, no differences were observed when livers were perfused with 0.5 or 1.0 mg/hr/g liver DOKG. These findings suggest that galactosamine-induced liver damage results indirectly from the loss of glycogen reserves in the liver cells.

1068 THE INTRACELLULAR SITE OF PYRUVATE CARBOXYLASE IN CHICKEN LIVER. *(Ger.)* Dugal, B. S. (Inst. Physiol. Chem., Univ. Gottingen, Germany). *Hoppe Seylers Z. Physiol. Chem.* 353(8): 1373-1375, 1972.

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1136 PHOSPHATASE ACTIVITIES OF CHICKEN LIVER AND DUODENUM: CHARACTERISTICS, LEVELS DURING DEVELOPMENT, AND HYDROCORTISONE-INDUCED CHANGES. *(E.)* Strittmatter, C. F. (Bowman Gray Sch. Med., Wake Forest Univ., Winston Salem, N.C.). *Biochim. Biophys. Acta* 284(1):183-195, 1972.

1137 GLUCONEOGENESIS AND AMINO ACID METABOLISM: I. COMPARISON OF VARIOUS PRECURSORS FOR HEPATIC GLUCONEOGENESIS *IN VIVO*. *(E.)* Aikawa, T.; Matsutaka, H.; Takezawa, K.; Ishikawa, E. (Inst. Protein Res., Osaka Univ., Japan). *Biochim. Biophys. Acta* 279(2):234-244, 1972.

1138 THE FORMATION OF BILIRUBIN MONO- AND DIGLUCURONIDE BY RAT LIVER MICROSOMAL FRACTIONS. *(E.)* Halac, E.; Dipiazza, M.; Detwiler, P. (New York Univ. Sch. Med., New York). *Biochim. Biophys. Acta* 279(3):544-553, 1972.

1139 INHIBITION OF FIBRINOLYSIS IN EXTRACORPOREAL PIG LIVER PERFUSION. *(E.)* Jedrychowski, A.; Parbhoo, S.; Hillenbrand, P. (Roy. Free Hosp., London, England). *Scand. J. Gastroenterol.* 7(6):551-554, 1972.

1140 INTERRELATIONSHIPS BETWEEN DIETARY METHIONINE AND CYSTINE AS REFLECTED BY GROWTH, CERTAIN HEPATIC ENZYMES AND LIVER COMPOSITION OF WEANLING RATS. *(E.)* Shannon, B. M.; Howe, J. M.; Clark, H. E. (Dept. Foods Nutr., Purdue Univ., Lafayette, Ind.). *J. Nutr.* 102(4):557-562, 1972.

1141 EXPRESSION OF DIFFERENTIATED FUNCTIONS IN HEPATOMA CELL HYBRIDS: VI. EXTINCTION AND RE-EXPRESSION OF LIVER ALCOHOL DEHYDROGENASE. *(E.)* Bertolotti, R.; Weiss, M. C. (Ctr. Molecular Genetics, CNRS, Gif-sur-Yvette, France). *Biochimie* 54(2):195-201, 1972.

1142 CARBON TETRACHLORIDE INDUCED PEROXIDATION OF LIVER LIPIDS IN VITAMIN E PRETREATED RATS. *(E.)* Comporti, M.; Benedetti, A. (Ist. Patol. Gen., Univ. Pisa, Italy). *Biochem. Pharmacol.* 21(3):418-420, 1972.

143 COMPARISON OF THE HYPERGLYCAEMIC AND GLYCOGENOLYTIC RESPONSES TO CATECHOLAMINES ITH THOSE TO STIMULATION OF THE HEPATIC SYMPATHETIC NNERVATION IN THE DOG. *(E.)* Edwards, A. V.; ilver, M. (Physiol. Lab., Univ. Cambridge, England). . *Physiol.* 223(2):571-593, 1972.

144 INDEPENDENCE OF GLUCAGON RECEPTORS AND GLUCAGON INACTIVATION IN LIVER CELL EMBRANES. *(E.)* Desbuquois, B.; Cuatrecasas, P. Johns Hopkins Univ., Sch. Med., Baltimore, Md.). *ature [New Biol.]* 237(76):202-204, 1972.

145 THE EFFECT OF HALOTHANE ON OXYGEN TRANSPORT IN LIVER AND BRAIN TISSUE. *(E.)* mets, P.; Besombe, J.; Longmuir, I. S. (Fac. Med., ree Univ. Brussels, Belgium). *Br. J. Anaesth.* 4(5):446-451, 1972.

146 HEPATIC ORGANELLE INTERACTION II. EFFECT OF TRICARBOXYLIC ACID CYCLE INTERMEDIATES N-DEMETHYLATION AND HYDROXYLATION REACTIONS IN T LIVER. *(E.)* Cinti, D. L.; Ritchie, A.; chenkman, J. B. (Yale Univ. Sch. Med., New Haven, nn.). *Mol. Pharmacol.* 8(3):339-344, 1972.

47 CHOLERETIC EFFECTS OF OUABAIN AND ETHACRYNIC ACID IN THE ISOLATED PERFUSED T LIVER. *(E.)* Graf, J.; Korn, P.; Peterlik, M. nst. Allgemeine Exp. Pathol., Univ. Vienna, stria). *Arch. Pharmacol.* 272(2):230-233, 1972.

48 HIGH YIELD OF HEPATIC TUMORS IN RATS BY CYCASIN. *(E.)* Fukunishi, R.; Terashi, S.; tanabe, K.; Kawaji, K. (Kagoshima Univ. Sch. Med., pan). *Gann* 63(5):575-579, 1972.

1149 PERFUSION OF THE ISOLATED PIG LIVER WITH HUMAN BLOOD. *(E.)* Hickman, R.; Saunders, S. J.; Goodwin, N. E.; Terblanche, J. (Univ. Cape Town, Union South Africa). *J. Surg. Res.* 11(11): 519-527, 1971.

1150 FEATURES OF THE MESOTHELIUM OF THE SEROUS MEMBRANE OF THE LIVER DURING EXPERIMENTALLY-INDUCED LIVER DISEASE. *(Rus.)* Rudenskaia, M. V. (Sklifosovskii Sci. Res. Inst. Emergency Med., Moscow, USSR). *Biull. Eksp. Biol. Med.* 74(8):107-111, 1972.

1151 INFLUENCE OF DIETARY IRON LEVELS ON HEPATIC DRUG METABOLISM *IN VIVO* AND *IN VITRO* IN THE RAT. *(E.)* Becking, G. C. (Dept. Natl. Health Welfare, Ottawa, Canada). *Biochem. Pharmacol.* 21:1585-1593, 1972.

1152 STABILIZATION OF RAT LIVER LYSOSOMES BY HEPARIN *IN VITRO*. *(E.)* Trigaux, J. P.; Ronveaux-Dupal, M. F.; Wattiaux, R. (Lab. Physiol. Chem., Fac. Univ. Namur, Belgium). *Biochem. Pharmacol.* 21(3):429-431, 1972.

See also, 0913, 0915, 0917, 0922, 0927, 0928, 0930, 0942, 0958, 0966, 0971, 1160, 1163, 1449, 1679, 1698, 1707, 1735, 1743, 1848, 1854

SECRETION AND METABOLISM

Intestine

53 STIMULATION OF JEJUNAL SECRETION BY A CRUDE ESCHERICHIA COLI ENTEROTOXIN. *(E.)* rce, N. F.; Wallace, C. K. (Baltimore City Hosp.,). *Gastroenterology* 63(3):439-448, 1972.

effects of culture filtrates of *Escherichia coli* e studied in perfused canine jejunal Thiry-Vella ps and in ligated segments of rabbit small bowel. enterotoxigenic *E. coli* strain employed was lated from the jejunum of a man in Calcutta with te cholera-like diarrhea. A culture filtrate of s strain had enterotoxic activity which was tially heat-stable, whereas control *E. coli* ain had no enterotoxic activity. A dose-response ve of the effect of the enterotoxin on canine jejunal absorption or secretion was obtained. The maximum secretory rates obtained were about 25% of those produced by cholera enterotoxin. The effect upon jejunal absorption reached a maximum within the first 90 min of exposure and disappeared equally rapidly, except at the highest doses studied, after removal of the enterotoxin. The *E. coli* enterotoxin did not increase jejunal clearance of serum albumin or diminish enhanced sodium absorption when the jejunal perfusion solution contained glucose. The electrolyte content of rabbit small bowel fluids induced by *E. coli* and cholera enterotoxins were similar. Perfusion of *E. coli* enterotoxin during maximal jejunal secretion induced by cholera enterotoxin did not further increase the secretory rate, suggesting that the two enterotoxins may act upon the same secretory mechanism. Repeated jejunal challenge with *E. coli* enterotoxin over a period of 8 weeks did not decrease jejunal responsiveness to the enterotoxin. The time course and dose response of *E. coli* enterotoxin upon jejunal function may explain differences in the clinical course of human diarrhea due to enterotoxigenic *E. coli* and *Vibrio cholerae*.

1154 THE IN VIVO UPTAKE OF VITAMIN B_{12} BY INTESTINAL BACTERIA IN RATS WITH JEJUNAL BLIND LOOPS. *(E.)* Schjonsby, H. (Gade Inst., Univ. Bergen, Norway). *Scand. J. Gastroenterol.* 7(5): 455-461, 1972.

Vitamin B_{12} labeled with ^{57}Co was given p.o. to control rats and to rats with surgically created jejunal blind loops, and the radioactivity in washed small intestinal sediments was determined at timed intervals after the dose. The radioactivity in the sediments as a percentage of recovered radioactivity from small intestinal contents and the amount of ^{57}Co-labeled vitamin B_{12}/mg dried sediment were significantly higher in untreated blind-loop rats than in control rats or in blind-loop rats treated with tetracycline and lincomycin. In blind-loop rats there was a delay in gastric emptying and stagnation of radioactivity in the blind-loop.

1155 ENZYMIC RELEASE OF ENTEROPEPTIDASE FROM ISOLATED RAT DUODENAL BRUSH BORDERS. *(E.)* Nordstrom, C. (Chem. Ctr., Univ. Lund, Sweden). *Biochim. Biophys. Acta* 268(3):711-718, 1972.

The release of enteropeptidase formerly known as enterokinase, from isolated Wistar rat duodenal brush borders by various enzymes (especially pancreatic proteases) was studied. Comparison was made with the release of other enzymic activities present in the brush border: lactase, sucrase, isomaltase, maltase, trehalase, alkaline phosphatase, and leucyl naphthylamidase. The release by bile salts was included for direct comparison. The enterokinase activity was released more easily by papain than any of the other enzymes. Trehalase activity was not released. Trypsin (0.06 mg/ml) and chymotrypsin (0.14 mg/ml) both caused a significant release of enterokinase activity but little or no release of the other enzymic activities. Carboxypeptidase and hyaluronidase did not release any brush-border enzymes. Bile salts (sodium taurocholate and sodium taurodeoxycholate 2/1) released about 35% of the enterokinase activity but also released equivalent amounts of other enzymic activities. Trypsin and chymotrypsin may both contribute to the high enterokinase activity present in duodenal juice. Enterokinase may be superficially located in the brush-border membrane and the brush-border enzymes may be organized within the membrane in a mosaic-like pattern.

1156 NAD GLYCOHYDROLASE FROM THE SMALL INTESTINE OF THE RAT: PURIFICATION, PROPERTIES AND POSSIBLE ROLE OF THE ENZYME. *(E.)* Kakehi, K.; Shimoyama, M.; Tanigawa, Y.; Asamizu, J. Ueda, I. (Osaka Med. Coll., Osaka, Japan). *Biochim. Biophys. Acta* 268(2):506-517, 1972.

In the investigation of NAD glycohydrolase in the small intestine of white male Wistar rats, the properties of this enzyme solubilized by lipase (glycerol-ester hydrolase) and purified 250-fold were essentially similar to its properties found in other tissues. The Km values for NAD and NADP were 2.7×10^{-5} and 3.8×10^{-6}M, resp. In the presence of less than 10^{-6}M NADP inhibition of NAD hydrolysis was more than 70% when NAD was used as substrate (6.25×10^{-6}M). In contrast to the NADP effect on NAD cleavage, a slight effect of NAD on the hydrolysis of the NADP was observed. In studies on the permeability of pyridine nucleotide in the small intestine no penetration of ^{14}C-labeled NAD prior to degradation to ^{14}C-labeled nicotinamide was observed. Thus, NAD glycohydrolase may contribute to the absorption of the pyridine moiety of NAD, which would be significant in the diet.

1157 PHYTASE AND ALKALINE PHOSPHATASE ACTIVITIES IN INTESTINAL MUCOSAE OF RAT, CHICKEN, CALF, AND MAN. *(E.)* Bitar, K.; Reinhold, J. G. (Dept. Biochem., American Univ., Beirut, Lebanon). *Biochim. Biophys. Acta* 268(2):442-452, 1972.

Phytate hydrolysis (phytase) activity was demonstrated in mucosal extracts from the small intestine of the rat, chicken, calf, and man. The 4 species differed markedly in pH-phytase activity profiles. These profiles differed from those of the intestinal alkaline phosphatases measured by release of phosphate from *p*-nitrophenyl phosphate or 3-glycerophosphate. Partial separation of phytase from phosphate activities was accomplished in the course of enzyme purification by treatment with *n*-butanol and $(NH_4)_2SO_4$ followed by chromatography on DEAE-cellulose. Differences in substrate-activity relations and inhibition by L-phenylalanine and NaF provide additional evidence that phytase does not promote hydrolysis of *p*-nitrophenyl phosphate or 3-glycerophosphate. Although assays for alkaline phosphatase and phytase in the presence of their substrates suggest that the enzymes are identical, this was invalidated by inhibition of intestinal alkaline phosphatase by sodium phytate. Treatment of phytase concentrates with EDTA lowers their activity significantly. Alkaline phosphatase is affected in a similar manner. Partial restoration of the activities of both enzymes in the chicken and enhancement of their activities in rat preparations occurred after addition of Zn^{++}. Higher concentrations of Zn^{++} caused inhibition, but to different extents.

1158 ADAPTATION OF SMALL BOWEL AFTER INTESTINAL RESECTION: INCREASE IN THE PENTOSE PHOSPHATE PATHWAY. *(E.)* Nakayama, H.; Weser, E. (Univ. Texas Med. Sch., San Antonio). *Biochim. Biophys. Acta* 279(3):416-427, 1972.

The effect of proximal and distal small bowel resection on intestinal glucose metabolism was

:udied in young male Sprague-Dawley rats. In a
ırticle-free supernatant solution prepared from
e mucosa of control animals, the specific activities
the following soluble enzymes were significantly
eater in proximal mucosa:glucose-6-phosphate
hydrogenase, 6-phosphogluconate dehydrogenase,
uctokinase, and phosphofructokinase. Recovery
a soluble fraction of the particulate-bound
zyme, hexokinase, was greater from the distal mucosa.
3 and 7 months after proximal or distal resection
ere was a significant increase in the specific
tivity of glucose-6-phosphate dehydrogenase and
phosphogluconate dehydrogenase in the mucosa
the remaining segments. No change was found
r other enzymes. Glucose utilization by normal
oximal mucosa was 6 times greater than distal
cosa and did not change after intestinal resection.
e precent of glucose metabolized by the pentose
osphate pathway was 5.3% in a normal proximal
cosa compared with 13.1% in normal distal mucosa.
ter distal or proximal small bowel resection,
ucose metabolism *via* the pentose phosphate path-
y increased to 8.4% in the proximal remnant and
26.2% in the distal remnant. An increase in
e pentose phosphate pathway is part of the
testinal adaptation to small bowel resection.
is pathway is related to increased nucleic acid
nthesis after resection. The change in glucose
tabolism accompanying mucosal hyperplasia may
crease pentose sugar production required for
cleic acid synthesis.

59 *Bacillus cereus*-INDUCED FLUID ACCUMULATION IN RABBIT ILEAL LOOPS. *(E.)* Spira, W.
; Goepfert, J. M. (Food Res. Inst., Univ. Wisconsin,
lison). *Appl. Microbiol.* 24(3):341-348, 1972.

50 ADSORPTION OF BILE ACIDS TO INTESTINAL MICROORGANISMS. *(E.)* Midtvedt, T.;
man, A. (Rikshospitalet, Oslo, Norway). *Acta*
hol. Microbiol. Scand. [*B*] 80(2):202-210, 1972.

1 DISTRIBUTION OF ALKALINE PHOSPHATASE AND ADENOSINE TRIPHOSPHATASE IN THE MUCOUS
BRANE OF THE SMALL INTESTINE. *(Rus.)* Zufarov,
A.; Akovbian, V. A.; Mavridi, D. I.; Alimdzhanov,
. R. (Tashkent Med. Inst., USSR). *Vopr. Pitan.*
:24-26, 1972.

2 COLON KALLIKREIN, ITS RELATION TO THE PLASMA ENZYME. *(E.)* Seki, T.; Nakajima,
Erdos, E. G. (Univ. Oklahoma Sch. Med., Oklahoma
y). *Biochem. Pharmacol.* 21(9):1227-1235, 1972.

1163 DISAPPEARANCE OF THE ANTI-ANAEMIA LIVER PRINCIPLE FOLLOWING DISTAL RESECTION OF THE SMALL INTESTINE IN PIGS. *(E.)* Petri, S.; Petri, C. (Oresund. Hosp., Denmark). *Acta Pathol. Microbiol. Scand.* [A] 80:207-210, 1972.

1164 INCORPORATION OF ^{3}H-THYMIDINE INTO DEOXYRIBONUCLEIC ACID OF MOUSE SMALL INTESTINE *IN VITRO*. *(E.)* Johanson, K. J. (Univ. Uppsala, Sweden). *Scand. J. Gastroenterol.* 7(5): 477-482, 1972.

1165 LOCALIZATION OF MICROBIAL L-TYROSINE DEGRADATION IN THE INTESTINE OF COPROPHAGY-PREVENTED RATS. *(E.)* Aarbakke, J.; Bakke, O. M. (Dept. Pharmacol., Univ. Bergen, Norway). *Scand. J. Gastroenterol.* 7(5):417-421, 1972.

1166 UNDERNUTRITION AND INTESTINAL DIPEPTIDE HYDROLASE ACTIVITY IN THE RAT. *(E.)* Kumar, V.; Chase, H. P. (Univ. Colorado Med. Ctr., Denver). *J. Nutr.* 101(11):1509-1514, 1971.

1167 LYSOLECITHIN ACYLTRANSFERASE IN HAMSTER INTESTINAL MUCOSA. *(E.)* Mansbach, II, C. M. (Duke Univ. Med. Ctr., Durham, N.C.). *Lipids* 7(9):593-595, 1972.

1168 INTESTINAL ALKALINE PHOSPHATASE: QUALITATIVE CHANGES PRODUCED BY DEFICIENT DIET IN RATS. *(E.)* Moreno, J.; Asteggiano, C. A.; de Cattoni, S. D.; Blanco, A. (Natl. Univ. Cordoba, Argentina). *Metabolism* 21(6):513-520, 1972.

1169 CONCENTRATION OF IODINE IN THE INTESTINAL LYMPH AFTER INTRADUODENAL ADMINISTRATION OF IODINATED SUBSTANCES. EXPERIMENTAL STUDY IN THE WAKING RAT. *(Fr.)* Leymarios, J.; Comoy, E.; Debray, C. (Bichat Hosp., Paris, France). *Pathol. Biol.* 20(11/14):603-606, 1972.

See also, 0910, 0912, 0914, 0915, 0916, 0932, 0936, 0967, 0987, 1032, 1057, 1136, 1177, 1887

GENERAL

0 GASTRIC BLOOD FLOW IN RESTRAINT STRESS. *(E.)* Guth, P. H. (Wadsworth VA Hosp.,
Angeles, Calif.). *Am. J. Dig. Dis.* 17(9):807-
, 1972.

Changes in gastric mucosal hemodynamics during the development of restraint-induced gastric erosions in the rat were studied with the indicator fractionation technic with ^{86}Rb. Cardiac output, gastric flow fractions, and gastric blood flow were determined in rats subjected to zero (control), 1/2,4 and 24 hr of restraint. Blood flow increased in all regions of the stomach, particularly the corpus, where blood flow increased in both the mucosa and muscle layers. A decrease in blood flow to the corpus after 30 min of restraint could account for linear erosions which developed after 4 hr. However, some animals (about 25% after 4 hr and 80% after 24 hr) had lesions in both corpus and antrum with no evidence of a similar decrease in antral blood flow. Thus, no correlation was found between gastric mucosal blood flow changes and the natural development of restraint erosions. Superficial engorgement of the mucosa, which develops after 30 min of restraint and before the appearance of mucosal erosions may result in a decrease in tissue resistence and permit subsequent erosion by gastric acid secretion. Mucosal engorgement appears to be related to local microcirculatory adjustment, perhaps mucosal vein constriction which reduces the rate of mucosal drainage, and is not a manifestation or result of overall changes in mucosal flow.

1171 THE EFFECT OF TRUNCAL VAGOTOMY ON JEJUNAL AND ILEAL BLOOD FLOW. *(E.)* Mackie, D. B.; Chir, M.; Turner, D. M. (Univ. Mississippi Med. Ctr., Jackson). *J. Surg. Res.* 11(7):356-363, 1971.

The hydrogen clearance method for measuring blood flow in unanesthetized unrestrained animals has been adapted to the gastrointestinal tract of dogs. Basal perfusion rates in both the jejunum (0.91 ml/g/min) and ileum (0.89 ml/g/min) were measured; there was no significant difference between the mean values. After bilateral truncal vagotomy combined with Heincke-Mikulicz pyloroplasty, paired observations were made in the early (under 3 weeks) and late (over 3 weeks) postvagotomy periods. To reduce the effect of hyperemia caused by infection, measurements were made only on dogs with uninfected wounds and with WBC less than 23,000/mm^3. In the early postvagotomy period significant reductions in blood flow occurred in both the jejunum and ileum, amounting to 49.5% and 48%, resp. The late effects of vagotomy were observed in only 5 dogs. In 4 dogs basal flow rates returned to normal or above normal. In 3 of these dogs this increase in blood flow occurred 25-33 days after vagotomy and in the remaining animal, after 74 days.

1172 CHANGES IN VASCULAR RESISTANCE INDUCED BY PROSTAGLANDINS E_2 AND $F_2\alpha$ IN THE ISOLATED RAT PANCREAS. *(E.)* Saunders, R. N.; Moser, C. A. (G. D. Searle & Co., Chicago, Ill.) *Arch. Int. Pharmacodyn. Ther.* 197(1):86-92, 1972.

Prostaglandins E_2 and $F_2\alpha$ were infused into isolated pancreases from male Sprague-Dawley rats in concentrations ranging from 0.01-10 μg/ml. Prostaglandin E_2 caused a dose-dependent decrease in vascular resistance, whereas prostaglandin $F_2\alpha$ had the opposite effect.

1173 CARCINOEMBRYONIC ANTIGEN (CEA) IN GASTROINTESTINAL AND EXTRA-GASTROINTESTINAL TUMORS AND ITS RELATIONSHIP TO TUMOR-CELL DIFFERENTIATION. *(E.)* Denk, H.; Tappeiner, G.; Eckerstorfer, R.; Holzner, J. H. (Inst. Pathol. Anat., Univ. Vienna, Austria). *Int. J. Cancer* 10(2):262-272, 1972.

Carcinomas of the colon (31), stomach (15), pancreas (6), liver (1), and anus (1) and normal large-bowel mucosa were studied by indirect immunofluorescence for the presence of the carcino-embryonic antigen (CEA). Carcinomas were classified according to their degree of cellular differentiation as well-differentiated, moderately differentiated, or anaplastic. An attempt was made to correlate the CEA content of the tumors with their classification. In well-differentiated tumors of the colon, including hypersecretory well-differentiated mucoid carcinomas, CEA was abundant on the luminal tumor cell surface and in the lumina of the glands. In moderately differentiated ones, CEA was present in low concentrations on the luminal surface and in secondary glandular structures. In anaplastic carcinomas, CEA was absent. In non-cancerous colonic mucosa surrounding the tumor, in colonic mucosa distant from the tumor, and in colonic mucosa taken at autopsy from subjects with non-neoplastic extragastrointestinal diseases, CEA could not be found by indirect immunofluorescence. The CEA content of gastric carcinomas was lower than in colonic tumors, although the distribution was similar. In pancreatic cancers, CEA was present in variable amounts depending on the differentiation of the individual tumors. In these malignancies, CEA was found not only on the luminal surface and in the lumina, but also in the cytoplasm of isolated tumor cells. CEA was not detected in carcinomas of extragastrointestinal origin by indirect immunofluorescence. The localization of CEA on the surface (probably glycocalyx) of the cell, together with its dependence upon a certain degree of tumor cell differentiation, suggest that CEA is a secretion product rather than a constituent of the tumor cell membrane.

1174 SEGMENTAL REVASCULARIZATION OF THE LIVER. *(E.)* Elias, E. G.; Evans, J. T. (Gen. Clin. Res. Ctr., Roswell Park Mem. Inst., Buffalo, N.Y.). *J. Surg. Res.* 12:346-349, 1972.

1175 THE EFFECT OF ADRENALECTOMY ON THE GASTROINTESTINAL TRACT: A REVIEW OF THE LITERATURE. *(E.)* Schapiro, H.; Britt, L. G. (Univ. Tennessee Med. Units, Memphis). *Rev. Surg.* 29(4):229-239, 1972.

1176 DIGESTION OF CONCENTRATES IN SHEEP. PART 4: THE EFFECTS OF UREA ON DIGESTION, NITROGEN RETENTION AND GROWTH IN YOUNG LAMBS. *(E.)* Orskov, E. R.; Fraser, C.; McDonald, I. (Rowett Res. Inst., Bucksburn, Aberdeen, Scotland). *Br. J. Nutr.* 27:491-501, 1972.

177 AN EXPERIMENTAL STUDY OF NON-AGGLUTINABLE VIBRIOS WHICH CAUSED GASTROENTERITIS N CLINICAL CASES. *(E.)* Kumar, S.; Dutta, N. K. Haffkine Inst., Bombay, India). *Indian J. Med. es.* 59(9):1378-1384, 1971.

178 FIBER DIGESTION IN THE BEAVER. *(E.)* Hoover, W. H.; Clarke, S. D. (Anim. et. Sci. Dept., Univ. Maine, Orono). *J. Nutr.* 02(1):9-15, 1972.

179 THE ARTERIAL CIRCULATION IN THE LIVER AFTER TOTAL BILIARY OBSTRUCTION IN DOGS. *.)* Ohlsson, E. G. (Malmo Gen. Hosp., Sweden). *ta Chir. Scand.* 138:51-58, 1972.

180 LIVER BLOOD FLOW IN TRAUMATIZED MICE. *(E.)* Schildt, B. E. (Res. Inst. Nat. Defense, ndbyberg, Sweden). *Acta Chir. Scand.* 138:59-68, 72.

81 EFFECT OF INTESTINAL MICROFLORA ON AGE-ASSOCIATED CHANGES IN HEPATIC XANTHINE IDASE AND IN BONE MINERAL COMPOSITION IN RATS. *.)* Reddy, B. S.; Pollard, M. (Lobund Lab., Univ. tre Dame, Notre Dame, Ind.). *J. Nutr.* 102(2): 9-305, 1972.

82 PLETHYSMOGRAPHIC STUDIES ON VASOMOTOR REGULATION IN STOMACH, INTESTINE, AND IN. *(E.)* Saito, N. (Dept. Int. Med., Sapporo d. Coll., Japan). *Sapporo Med. J.* 39(5/6):208-4, 1971.

1183 SELECTIVE COELIAC AND HEPATIC ARTERY ANGIOGRAPHY IN NORMAL DOGS. *(E.)* Enge, I.; Flatmark, A. (Rikhospital, Oslo, Norway). *Scand. J. Gastroenterol.* 7(4):361-368, 1972.

1184 STUDIES OF GASTROINTESTINAL INTERACTIONS. III. DETERMINATION OF GASTRIC SECRETION AND EVACUATION, BILIARY AND PANCREATIC SECRETION, INTESTINAL ABSORPTION, INTESTINAL TRANSIT TIME AND FLOW OF WATER IN MAN. *(E.)* Johansson, C.; Lagerlof, H. O.; Ekelund, K.; Kulsdom, N.; Larsson, I.; Nylind, B. (Karolinska Hosp., Stockholm, Sweden). *Scand. J. Gastroenterol.* 7(5):489-499, 1972.

1185 A SIMPLIFIED METHOD OF CANNULATING THE INTESTINAL LYMPHATIC OF THE RAT. *(E.)* Warshaw, A. L. (Massachusetts Gen. Hosp., Boston). *Gut* 13:66-67, 1972.

1186 TWENTY FOUR HOUR FLUCTUATIONS IN THE CONCENTRATION OF PARAMAGNETIC CENTRES IN THE MOUSE LIVER IN NORMAL CONDITIONS. *(E.)* Kovalenko, O. A.; Anfalova, T. V.; Chibrikin, V. M. (Inst. Chem. Phys., Moscow, USSR). *Biofizika* 16(5):869-873, 1972.

See also, 1084

1187 ^{75}Se-SELENOMETHIONINE SCANNING IN THE DIAGNOSIS OF TUMOURS OF THE PANCREAS AND ADJACENT VISCERA: THE USE OF THE TEST AND ITS IMPACT ON SURVIVAL. *(E.)* McCarthy, D. M.; Brown, P.; Melmed, R. N.; Agnew, J. E.; Bouchier, I.A.D. (VA Hosp., San Francisco, Calif.). *Gut* 13(2):75-87, 1972.

Pancreatic scanning with ^{75}Se-selenomethionine was conducted in 393 patients over 2 yr. On follow up 55 patients had operatively proven malignant tumours in the pancreas and another 22 had similar tumours in adjacent organs, clinically mimicking carcinoma of the pancreas and in many cases causing scan abnormalities. The neoplasms were distributed as follows: carcinoma of the pancreas head (32), body (16), tail (6); periampullary duodenal tumors (7); common bile duct (7); pancreatic adenomata (5); hepatic duct (4); gallbladder (1); hepatoma (1); hemangiosarcoma (1). Remote tumours rarely affected the scan. The test was effective in screening and in detection in patients with neoplastic disease; false negative diagnoses were rare. Survival following diagnosis was extremely poor with only 8% of pancreatic tumours resectable and 50% metastasized at the time of surgery. Tumors of the common bile duct or periampullary duodenal mucosa are small, resectable, localized and have a fair prognosis. Causes of pancreatic dysfunction, other than pancreatitis or carcinoma are associated with abnormalities on the scan. The patterns seen in abnormal scans, while non-specific with regard to etiology, were anatomically meaningful and useful adjuncts to the diagnosis of pancreatic disease. A normal scan excluded pancreatic cancer with a probability greater than 95%.

1188 A CLINICAL EVALUATION OF ANORECTAL PRESSURE STUDIES IN THE DIAGNOSIS OF HIRSCHSPRUNG'S DISEASE. *(E.)* Aaronson, I.; Nixon, H. H. (Hosp. Sick Children, London, England). *Gut* 13:138-146, 1972.

Stimulation of the rectum by stretch results, in the normally innervated bowel, in the reflex relaxation of the internal anal sphincter. The absence of this rectosphincteric reflex in Hirschsprung's disease forms the basis of a simple and safe diagnostic test. Studies over 2 yr with a simplified air-filled pressure probe system are described, based on the examination of 267 infants and children with abnormal bowel function, of whom 114 were suffering from Hirschsprung's disease. An additional 30 asymptomatic patients were also studied. Patients age ranged from 3 days to 9 yr.; 17 were examined in the first 2 weeks of life; 38 were under 1 yr old; 2 were premature; and 2 suffered from Down's syndrome. Patients were referred for chronic constipation or intestinal obstruction; 6 had diarrhea associated with abdominal distension; 2 infants suffered spontaneous perforation of the bowel. Other presenting conditions included acquired megacolon, anal stenosis, functional intestinal obstruction, meconium ileus, and bowel atresia. In review of the last 100 consecutive patients examined this method shows an overall diagnostic reliability of 85%, comparable to that of a barium enema or a first rectal biopsy. It has proved easier to exclude the disease (90.8%) than to confirm its presence (74.3%). It is more reliable than the barium enema in the diagnosis of ultrashort segment disease. There are common pitfalls in the interpretation of the trace. This diagnostic method deserves use in the routine investigation of Hirschsprung's disease alongside the barium enema and rectal biopsy, particularly as a simple screening test in outpatients.

1189 SONOGRAPHIC DIAGNOSIS OF PANCREATIC LESIONS. *(E.)* Stuber, J. L.; Templeton, A. W.; Bishop, K. (Univ. Kansas Med. Ctr., Kansas City). *Am. J. Roentgenol.* 116(2):406-412, 1972.

In reviewing 250 sonograms obtained in an 8 month period, 31 cases were selected where the presence or absence of pancreatic disease was diagnosed by ultrasound techniques. Clinical records, roentgenographic studies, and operative reports were correlated with sonographic studies. Pathological examinations confirmed the presence of pancreatic carcinomas (8 cases) pancreatitis (12), and pseudocysts (3). Of the 8 carcinomas, 7 had similar ultrasonic characteristics. Lesions appeared with irregular borders, often lobulated. Internal echoes were usually notable at routine scanning sensitivities, perhaps due to necrosis within the tumor or to residual normal pancreatic tissue. Tumors of 2 or 3 cm may be identifiable. Of the 8 carcinoma patients, 1 also suffered from a malignant antral ulcer. Sonograms of some pancreatitis cases also revealed cholelithiasis. At normal scanning sensitivity, pancreatitis is revealed as an elongated, transonic area anterior to the aorta and vena cava; the thickness of the sonographic image is related to the amount of organ edema present. Borders are usually smooth and distinct. When transducer sensitivities increase, internal echoes develop. Pseudocysts were round to oval transonic masses at normal sensitivity settings. Internal echoes appeared at higher sensitivities due to heterogeneity of the cyst contents. Of 18 surgical cases, 16 sonographic diagnoses were accurate. Of 13 non-operated patients there was 1 false positive, perhaps because through transmission was not obtained. Sonography should be the initial procedure in evaluating patients with suspected pancreatic disease.

1190 PANCREAS, SCINTIGRAPHY AND ELECTRONIC SUBTRACTION. *(Fr.)* Desgrez, A.; Bismuth, H.; Testas,; Regensberg, C.; Bok, B.; Lemort, J.-P. (Frederic Joliot Hosp., Paris, France). *Nouv. Presse Med.* 1(15):1003-1008, 1972.

A new approach is presented in selenomethionine pancreatic scanning, involving electronic subtraction and contrast enhancement to prevent liver and intestinal interference in the final image. Selenomethionine (250-300µCi ^{75}Se) associated with gold (180 µCi ^{198}Au) or technetium (800µCi ^{99m}Tc) is administered to the fasting patient with no other preliminary treatment. Recording, focusing on both isotopes simultaneously,

.s started 12 to 15 min after the administration
f selenomethionine and is continued for 45 to 50
in. The image attained at the end of the recording
eriod reveals clearly the head of the pancreas
lthough no optimum pancreas/liver and pancreas/
erum ratios have been reached as yet. Subtraction
chieved after one hour of recording is based on
he known metabolism and transport rates of
elenomethionine in the liver and the intestinal
all. Best diagnositic results have been attained
o far in diagnosing pancreatic pseudocysts, isolated
ancreatitis foci, and abscesses. Malignant tumors
rovide hard-to-interpret images, while intestinal
ixation of the isotope, exceeding the weak level
f such binding which occurs under normal conditions,
s reliable indication of chronic pancreatitis.
dditional information is expected from further use
f the technique with the focus on the binding kinetics
ccurring within each image-constituting element.

191 AGAR GEL ELECTROPHORESIS OF PROTEOLYTIC
ENZYMES IN GASTRIC JUICE OF PATIENTS WITH
HRONIC GASTRITIS. *(E.)* Agunod, M.; Glass, G. B. J.
New York Med. Coll., New York, N.Y.). *Am. J. Dig.
is.* 17(9):814-825, 1972.

gar gel electrophoresis with proteolytic digestion
f albumin substrate and subsequent Chromoscan analysis
f the agar slide were used to study the proteolytic
nzymes of gastric juice in 28 patients with atrophic
astritis with or without intestinal metaplasia, 7
atients with chronic superficial gastritis, and 6
ith normal gastric mucosa. Proteolytic enzyme spots,
esignated I through V in order of decreasing anodic
obility, were present in gastric juice from normal
ontrols. Of these spots, spot II (pepsin) was lar-
est; spot III (presumably gastricsin) was next in
rominence, followed by spot I (prepepsin, presumably
egradation product or products of pepsin). Spot IV,
ich had slow anodic mobility (pepsinogen), was
ather small and sometimes absent, and spot V was seen
ly rarely and in traces. In 12 of 14 patients with
trophic gastritis and no intestinal metaplasia, spots
and III were decreased in area and well demarcated.
ot IV was often large and spot I was most often
sent. Twelve patients with atrophic gastritis
th intestinal metaplasia and 2 patients with gastric
trophy showed either: absence of all five spots (5
ses, including 3 with pernicious anemia) or a
rked reduction of area and good demarcation of
ots II and III with absence or reduction of spot I
cases); in 1 case, spots I, II, and III were
sent. In 4 cases of atrophic gastritis with or
thout intestinal metaplasia (3 were associated
th gastric cancer) a distinct spot V was seen.
6 of the 7 cases of chronic superficial gastritis
normal pattern was seen; in 1 case the pattern
sembled that seen in atrophic gastritis without
taplasia. This method of analyzing proteolytic
zymes in gastric juice is of interest for evaluating
ronic gastritis.

92 ACCELERATION OF THE BARIUM MEAL THROUGH
THE SMALL INTESTINE BY THE C-TERMINAL
TAPEPTIDE OF CHOLECYSTOKININ. *(E.)* Hedner, P.; Rorsman, G. (Univ. Hosp., Lund, Sweden). *Am. J. Roentgenol.* 116(2):245-248, 1972.

During i.v. infusion of the synthetic C-terminal octapeptide of cholecystokinin (C8-CCK), the barium meal passed from the distal portion of the duodenum to the cecum within 20 minutes in 10 healthy subjects. A contrast medium coating was left on the mucosal surface of almost the entire small intestine. This technique makes it possible to examine the small bowel in an uninterrupted sequence under fluoroscopy with spot roentgenography of areas of interest. No harmful side effects were encountered. Without C8-CCK, the corresponding transit times in the same subjects were 30-240 min.

1193 USE OF THE C-TERMINAL OCTAPEPTIDE OF CHOLECYSTOKININ FOR GALLBLADDER EVACUATION OF CHOLECYSTOGRAPHY. *(E.)* Hedner, P.; Lunderquist, A. (Univ. Hosp., Lund, Sweden). *Am. J. Roentgenol.* 116(2):320-326, 1972.

In the present study, the synthetic C-terminal octapeptide of cholecystokinin was administered to 50 patients (22 men and 28 women, aged 18-65 yr) referred for cholecystography because of symptoms suggestive of gallbladder disease. The preparation had a shorter duration of action than extracted cholecystokinin, but produced evacuation of the gallbladder and visualization of the bile ducts without any harmful side effects. The synthetic C-terminal octapeptide of cholecystokinin may be a valuable alternative to extracted preparations that are not available at present in amounts sufficient for routine clinical use.

1194 LACTATE DEHYDROGENASE IN GASTRIC JUICE: DIAGNOSTIC ADJUNCT IN HUMAN STOMACH CANCER. *(E.)* Faulk, W. P.; Rider, J. A.; Swader, J. I. (Immunology, WHO, Geneva, Switzerland). *Lancet* 2(7787):1115-1117, 1972.

Gastric-juice lactate dehydrogenase (LDH) levels in 25 normal subjects and 115 patients with ulcer, (17 duodenal, 19 gastric), gastritis, (11 superficial, 12 hypertrophic, 16 atrophic, 27 mixed) or gastric tumour (4 benign, 2 sarcoma, 7 carcinoma) showed graded increases with disease. The highest gastric-juice LDH levels were seen in gastric carcinoma. Values in excess of 10,000 μ/hr indicate some disease is present; 30,000 μ/hr indicate carcinoma is a strong possibility. No correlation exists between LDH values in serum and gastric juice.

1195 RAPID SEQUENTIAL LIVER IMAGING. *(E.)* Waxman, A. D.; Apau, R.; Siemsen, J. K. (Univ. Southern California Med. Ctr., Los Angeles). *J. Nucl. Med.* 13(7):522-524, 1972.

A group of 77 patients (16 hospitalized for non-liver diseases, 22 for metastatic carcinoma of the liver, 2 for primary liver carcinoma, 8 for hepatic abscess, 14 for cirrhosis, and 8 for lymphoma) were given an i.v. bolus of ^{99m}Tc as sulfur colloid to detect changes in hepatic circulation. The findings are useful in differential diagnosis of space-occupying lesions of the liver. Since early hepatic uptake is noted in cirrhosis, lymphoma, or diffuse metastatic disease, the test is not useful in differentiating these entities. However, the test is useful in differentiating normal from pathological livers and cyst or abscess (in which a defect appears in the scan and does not fill during the study) from large tumors (where a high concentration of isotope relative to surrounding tissue appears early with the central area of the tumor filling later than peripheral areas).

1196 PRELIMINARY RESULTS FROM RETROGRADE PANCREATOGRAPHY BY DUODENOSCOPY IN THE DIAGNOSIS OF CHRONIC PANCREATITIS. *(Ger.)* Wiesner, W.; Weiss, H. D.; Anacker, H. (2nd Med. Clin., Technical Univ., Munich, Germany). *Dtsch. Med. Wochenschr.* 97(26):991-994, 1972.

Retrograde pancreaticography by duodenoscopy was performed in patients suspected of having chronic pancreatitis (15) or papillary stenosis with secondary chronic pancreatitis (2), and in 3 patients with chronic pancreatitis, to clarify the state of drainage in the pancreatic-duct system. Duct changes characteristic of chronic pancreatitis (12), papillary stenosis (2), abnormal pancreatic-duct drainage (7) and pancreatico-lithiasis (1) were observed. In patients with chronic pancreatitis the changes in the ductal system consisted of irregular wall pattern (11) and changes in size of lumen (12). There were multiple stenoses and dilatation (7), and entire pancreatic duct enlargement (5). Endoscopic pancreaticography is a valuable addition in the diagnosis of chronic pancreatitis. Even when chronic pancreatitis is known to be present, indications for surgery and choice of method can be defined when there is significant interference of pancreatic drainage resulting from stenosis in the duct system.

1197 QUANTITATIVE STUDIES OF TOXIN IN THE STOOLS AND JEJUNAL ASPIRATES OF PATIENTS WITH CHOLERA. *(E.)* Aziz, K. M. S.; Mosley, W. H. (Pakistan-SEATO Cholera Res. Lab., Dacca, Bangladesh). *J. Infect. Dis.* 125(1):36-44, 1972.

Stools and jejunal aspirates from patients with acute cholera were sterilized by filtration and stored at –40 C to –50 C. Of the 35 cases studied, 29 were infected with classical *V. cholerae*, Inaba serotype; one with El Tor biotype, Inaba serotype; 2 with classical Ogawa serotype; 3 with El Tor biotype, Ogawa serotype. These filtrates were assayed for potency in the skin of the back of adult rabbits (measured by blueing doses and limit of blueing units) and for fluid-producing activity in the ligated intestinal loops. Two toxins prepared *in vitro* were also assayed. A consistent relation was observed among the 3 systems of assay for cholera toxin both from the *in vitro* preparation, and from stools and jejunal aspirates. Based on assays of pure toxin, the content of toxin in stools from patients with acute cholera was estimated to be about 60 μg/liter. Stools had higher bacterial counts and were more toxic than jejunal aspirates obtained simultaneously from the same patients. No correlation existed between severity of disease, as judged by total output of stool, and the toxicity of the samples of stool or jejunal aspirates.

1198 AN EXPERIMENTAL, AND CLINICAL STUDY ON THE DIAGNOSTIC METHOD ON DISEASES OF THE LIVER AND BILIARY TRACT THROUGH EXTRACORPOREAL ^{131}I-R.B. MEASUREMENT. *(Jap.)* Yamamoto, K. (Tokyo Med. Coll., Japan). *J. Tokyo Med. Coll.* 30(2):203-231, 1972.

1199 THE USE OF INSPIRATION-EXPIRATION SCINTIPHOTOGRAPHS TO DETERMINE THE INTRINSIC OR EXTRINSIC NATURE OF LIVER DEFECTS. *(E.)* Oppenheim, B. E.; Hoffer, P. B.; Gottschalk, A. (Univ. Chicago Hosp., Ill.). *J. Nucl. Med.* 13(7):554-556, 1972.

1200 UPTAKE OF ^{75}Se-SELENOMETHIONINE BY HEPATOMA. *(E.)* Stolzenberg, J. (Mercy Hosp., Miami, Florida). *J. Nucl. Med.* 13(7):565-566, 1972.

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CASES INCLUDING 40 ESOPHAGEAL AND GASTRIC
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See also, 0975, 0990, 1026, 1040, 1316, 1375, 1377, 1389, 1419, 1440, 1529, 1783, 1879, 1922, 1943

GASTROINTESTINAL DISEASES

ESOPHAGUS

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In 10 patients with achalasia, successful pneumatic dilatation induced a predictable and significant reduction of elevated resting lower esophageal sphincter (LES) pressure. This decreased LES pressure still maintained an effective barrier against reflux after dilatation. In untreated achalasia, incomplete relaxation left a residual pressure at the LES, indicating obstruction here during swallowing. After dilatation, this residual pressure was normal, independent of resting LES pressure, and complete relaxation became an all or nothing at all response to swallowing. Elevated resting pressure in the body of the esophagus reverted to normal, but characteristic abnormal swallowing responses of this segment were not changed by pneumatic dilatation.

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standard lye burn was given to 40 dogs, divided nto 3 groups, to determine if esophageal stenosis an be prevented by altering cross-linking of newly ynthesized collagen. Group I (11 dogs) received o therapy. Group II (17) received biweekly ougienage and daily injections of prednisolone 0.1 mg/kg/day i.m.). Group III (12) received -aminopropionitrile (BAPN) fumarate (100 mg/kg/day .p.). Therapy was administered for 6 weeks; observation continued for 12 weeks. BAPN was as effective s bougienage and steroid treatment. Moreover, in roup III dogs, stenosis did not recur during the week post-treatment observation period while it id recur in 35% of the group II dogs. This uggests that the fundamental mechanism involved n esophageal stenosis is not wound contraction, ut collagen synthesis, deposition and remodeling. ontrolled induced lathyrism is suggested also in reatment of established stenosis.

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sophageal perforations seen in 33 patients within 20-year period are reviewed. Perforation occurred ollowing spontaneous rupture (12), instrumental robing (16), foreign body trauma (1), thoractomy 3), and of unknown causes (1). Endoscopic perfoation in patients with neoplastic disease of the sophagus carried a 100% mortality despite early iagnosis and immediate resection of the growth. nly 2 deaths occurred after instrumental perforation f the thoracic esophagus for benign pathology and hese were an 18-month old girl with a caustic stricture and a 75-yr-old woman. Although the mortality figure for spontaneous rupture (1/12) was encouraging, postoperative complications occurred in all but one of the survivors. Prompt and adequate intercostal drainage with early re-expansion of affected lungs and subsequent jejunostomy are necessary to combat post-operative mortality. Early contrast radiology is suggested to define the site and extent of perforation.

1294 ORIGIN OF PLEURAL FLUID AMYLASE IN ESOPHAGEAL RUPTURE. *(E.)* Sherr, H. P.; Light, R. W.; Merson, M. H.; Wolf, R. O.; Taylor, L. L.; Hendrix, T. R. (Johns Hopkins Univ. Sch. Med., Baltimore, Md.). *Ann. Intern. Med.* 76(6): 985-986, 1972.

A 43-yr-old female alcoholic with esophageal rupture and elevated pleural fluid amylase activity (admission level 2600 Caraway μ/ml rising to 10,500 Caraway μ/ml in 24 hr) mimicking acute pancreatitis was studied to find the origin of the enzyme. Polyacrylamide gel electrophoretic patterns were typical for human salivary amylase with several rapidly migrating isoamylase bands. Esophageal rupture, among other disorders, can cause elevation of pleural fluid amylase. This should be recognized to avoid attributing the abnormality to acute pancreatitis, thereby delaying surgery. A helpful diagnostic feature is that in esophageal rupture pleural fluid is often purulent; in pancreatitis it is sterile.

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1337 ESOPHAGEAL-TRACHEAL FISTULA AFTER AN UNKNOWN FOREIGN BODY HAD LODGED IN THE ESOPHAGUS. *(Ger.)* Seikrit, H. (Munic. Clin., Berlin-Buch, Germany). *Dtsch. Gesundheitsw.* 27(8): 361-362, 1972.

1338 MANIFEST RETROPHARYNGEOESOPHAGEAL ABSCESSES. *(Ger.)* Bruna, J.; Janecka, V. (Inst. Postgrad. Med., Prague, Czechoslovakia). *Fortschr. Roentgenstr.* 117(1):33-38, 1972.

1339 SURGICAL TREATMENT OF DIAPHRAGMATIC HIATUS HERNIA. *(Fl.)* Cornette, W.; Vyncke, G.; Kerremans, R.; Beckers, J. (St. Raphael Acad. Hosp., Louvain, Belgium). *Tijdschr. Gastroenterol.* 15(3): 159-170, 1972.

See also, 0985, 1204, 1215, 1243, 1252, 1838, 1955

1340 THE FUNCTIONAL 'G' CELL MASS IN ATROPHIC GASTRITIS. *(E.)* Korman, M. G.; Strickland, R. G.; Hansky, J. (Prince Henry's Hosp., Melbourne, Australia). *Gut* 13(5):349-351, 1972.

The serum gastrin response to a standard protein meal has been determined in 8 achlorhydric patients with atrophic gastritis and contrasted with normal subjects whose gastric contents were kept neutral by intragastric bicarbonate instillation. Five normal subjects significantly increased in serum gastrin from a mean of 17 ± 3 pg/ml to 119 ± 10 pg/ml, but their response did not approach that of 4 patients with atrophic gastritis and antral sparing (605 ± 133 pg/ml to 1418 ± 186 pg/ml). By contrast, in 4 patients with antral gastritis, there was no significant change in gastrin levels (24 ± 13 pg/ml to 55 ± 19 pg/ml). The gastrin-secreting cell mass is increased in atrophic gastritis with antral sparing and decreased in atrophic gastritis with antral involvement. There exist in man 2 distinct forms of atrophic gastritis. In the first the antrum is spared from gastritis and basal hypergastrinemia, and there is a large functional 'G' cell mass. Most patients are seropositive for parietal cell antibody; many have pernicious anemia. Patients in the second form have antral gastritis, normal basal gastrin levels, a small functional 'G' cell mass, and are mainly seronegative; they do not have pernicious anemia.

1341 CIRCADIAN RHYTHMICITY OF GASTRIC SECRETION AND CYCLIC 3',5'-ADENOSINE MONOPHOSPHATE CONTENTS OF GASTRIC MUCOSA IN RATS. *(E.)* Domschke, W.; Classen, M.; Demling, L. (Dept. Med., Univ. Erlangen-Nurnberg, Erlangen, Germany). *Scand. J. Gastroenterol.* 7(1):39-41, 1972.

The gastric acid output and cyclic 3',5'-adenosine monophosphate contents of gastric mucosa were determined in fasting male and female Wistar rats. No significant sex-related differences were observed. A concomitant diurnal rhythm was demonstrated for both acid output and cyclic AMP contents of gastric mucosa. This was characterized by a peak at midnight and a trough at noon.

1342 THE EFFECT OF VAGOTOMY AND PYLOROPLASTY ON THE GASTROINTESTINAL MUCOSA OF THE RAT. *(E.)* Liavag, I.; Vaage, S. (Deaconess Hosp., Oslo, Norway). *Scand. J. Gastroenterol.* 7(1):23-27, 1972.

Within five weeks after truncal vagotomy and pyloroplasty in rats, there tended to be a reduction in mucosal thickness of the stomach and small intestine compared with sham-operated animals. The reduction, however, was only significant in the corpus mucosa of the stomach. The rate of epithelial cell proliferation was lower in the stomach of these rats than in the sham-operated rats. The rate decrease, however, was only significant in the pyloric mucosa. In the duodenum, jejunum, and ileum, the rate of cell proliferation was higher than in the sham-operated animals. In the jejenum the increase was highly significant.

1343 GASTRIC CARCINOMA IN PERNICIOUS ANEMIA AND IN PATIENTS WITH AND WITHOUT ACHLORHYDRIA. *(E.)* Kuster, G. G. R.; ReMine, W. H.; Dockerty, M. B. (Mayo Clin., Rochester, Minn.). *Ann. Surg.* 175(5):783-789, 1972.

The relationship of gastric carcinoma to the status of the remaining gastric mucosa and its secretory capacity was studied in 622 patients who had undergone gastrectomy for carcinoma of the stomach. Carcinomas of the stomach which developed in patients with atrophic gastritis and achlorhydria (138) or in patients with achlorhydria and pernicious anemia (56) were usually in the upper part of the stomach, polypoid, frequently multiple, and of a low grade of malignancy. In contrast, in patients with acid and normal gastric mucosa or mild gastritis (428), small ulcerated carcinomas developed in the antral segment of the stomach, were single, and were of a high grade of malignancy. Postoperative survival was better in patients with achlorhydria, mainly due to the lower histologic grade of malignancy. Gastric analysis should direct suspicion to a particular area of the stomach. It is apparent that the mucosal background upon which a gastric cancer develops influences the clinical, pathologic, and prognostic characteristics of the tumor and, indeed, possibly its genesis.

1344 HYPERPARATHYROIDISM: GASTRIC ACID SECRETION AND GASTRIN. *(E.)* Dent, R. I.; James, J. H.; Wang, C. A.; Deftos, L. J.; Talamo, R.; Fischer, J. E. (Harvard Med. Sch., Boston, Mass.). *Ann. Surg.* 176(3):360-369, 1972.

The relation between gastric acid secretion and blood levels of calcium, parathyroid hormone, and gastrin was studied in 23 patients with hyperparathyroidism both before and after parathyroid surgery. Preoperative and postoperative augmented histamine tests were run and patients were classified as those with elevated basal acid output, those with elevated basal acid outputs with possible Zollinger-Ellison syndrome, and those with achlorhydria. Both serum calcium and parathyroid hormone concentrations fell after successful parathyroidectomy; plasma gastrin was also decreased. A greater fall occurred in that group of patients with high preoperative plasma gastrin levels. In 3 patients with achlorhydria and high plasma gastrin who were not typical of patients with pernicious anemia, a fall in plasma gastrin was associated with a fall of serum calcium. Since the effects of decreased calcium and decreased parathyroid hormone levels were not separable on the basis of the above data, plasma gastrin was estimated after calcium and EDTA infusions. Preliminary data indicate that the level of ionized calcium is primary in the control of plasma levels of gastrin. The secondary effect of parathyroid hormone cannot be ruled out. Two patients had possible Zollinger-Ellison syndrome associated with hyperathyroidism. In one patient complete remission of gastric acid hypersecretion and symptoms of Zollinger-Ellison syndrome followed successful parathyroidectomy. It is suggested that control of hypercalcemia precede any attempt at remedial gastric

surgery in patients suspected of Zollinger-Ellison
syndrome and associated hyperparathyroidism.

1345 PLASMA PROTEIN TURNOVER (ALBUMIN, TRANSFERRIN,
IgG, IgM) IN MENETRIER'S DISEASE (GIANT
IYPERTROPHIC GASTRITIS): EVIDENCE OF NON-SELECTIVE
PROTEIN LOSS. *(E.)* Jarnum, S.; Jensen, K. B. (Rigs-
ıospitalet, Copenhagen, Denmark). *Gut* 13:128-137,
1972.

'en patients (3 females and 7 males, aged 29-62 yr)
vith Menetrier's disease have been studied with
adioiodine-labeled albumin (all 10 cases), IgG (8),
ransferrin (2), and IgM (6). Abnormal gastric loss
f plasma protein was present in all cases as demon-
trated by ^{59}Fe-iron dextran (8 cases), ^{51}Cr-albumin
1), and ^{131}I-polyvinylpyrrolidone (1). Three
atients suffered from additional diseases: sarcoidosis
n prednisone treatment (1 case); nephrotic syndrome
1); and pulmonary carcinoma (1). In the cases of
he 3 females, Menetrier's disease was transitory.
one of the patients had more distal gastrointestinal
esions. The synthetic rate of the proteins studied
as normal or slightly elevated. The fractional
atabolic rate of the proteins was increased. The
ncrease above the normal mean was similar for
lbumin, transferrin, and IgG. Since the molecular
eight of IgG is more than twice that of albumin
nd transferrin, the protein loss in Menetrier's
isease is nonselective since it affects a similar
raction of the intravascular masses of all plasma
roteins. IgM catabolism was strongly accelerated.
imultaneous studies with ^{59}Fe-iron dextran, radio-
odine-labeled albumin or IgG showed that IgM
ypercatabolism could partly be due to abnormal
astric protein loss, since IgM catabolism was
ignificantly more raised than that of albumin and
gG. Fecal radioiodine excretion was normal in
ost patients after the injection of radioiodine-
abeled proteins. Increased gastrointestinal ^{59}Fe
learance after injection of ^{59}Fe-iron dextran
ssociated with normal fecal radioiodine excretion
fter the injection of radioiodine-labeled proteins
ermits diagnosis of protein loss in the stomach.

346 GENETIC ASPECTS OF THE Z-E SYNDROME: PRO-
SPECTIVE STUDIES IN TWO KINDRED; ANTRAL
ASTRIN CELL HYPERPLASIA. *(E.)* Friesen, S. R.;
chimke, R. N.; Pearse, A. G. E. (Univ. Kansas Sch.
ed., Kansas City, Kans.). *Ann. Surg.* 176(3):370-
83, 1972.

here is a genetic basis for the development of the
ollinger-Ellison (Z-E) and the MEA (multiple endo-
rine adenomatosis) syndromes as phenotypic variants
f the same mutant gene. Antral G cell (the gastro-
ntestinal endocrine cell) studies were made on 2
ypes of patients (a) 2 families, ascertained through
proband affected with the Z-E syndrome and (b) non-
elated patients with duodenal ulcer, hyperpara-
hyroidism, acromegaly, Z-E syndrome, and some with
o endocrine disease. In the R family (29 members,
generations) 11 of 15 members studied have the
ollowing abnormalities: islet cell tumors (2),
astroduodenal carcinoid tumor (1), hyperparathyroidism (4), and gastric hyperrugation with ulcer (8). In the P family 11 of 14 members studied have: hyperparathyroidism due to adenoma and/or hyperplasia (4), metastatic islet cell tumor (1), nonfunctional pituitary lesion (1), and functional adrenal cortical lesion (1). In this family the degree of apparent G cell hyperplasia correlated positively with gastric acid hypersecretion. True but moderate G cell hyperplasia was noted in antrums of duodenal ulcer patients. In members with Z-E syndrome but no gross pancreatic lesions the serum gastrin values were very high (2,800-9,500 pg/ml) and the antral G cell population constituted 15% of the area of the antral mucosa (30 times the normal). With metastatic involvement of lymph nodes, liver, and lung and high serum gastrin levels, the number of G cells varied from 6-12 per gland rosette. Marked gastrinosis of antral mucosa was associated with gastric acid hypersecretion and high serum gastrin levels. One patient with several clinical manifestations of Z-E syndrome due to islet cell hyperplasia without tumor had 2-7 G cells per gland rosette. A normal population of antral G cells was noted in 4 patients with demonstrable pancreatic islet cell tumors. Antral G cell hyperplasia in the MEA type I syndrome is of sufficient magnitude to be consistent with the term "gastrincytoma". Changes in the G cells apparently precede the development of symptomatic endocrine disease. The antral G cell hyperplasia in patients having Z-E syndrome without tumors suggest that antral G cell hyperplasia may precede the development of islet cell tumors. The gastrointestinal endocrine cell may be used in early diagnosis of the MEA, type I syndrome.

1347 GASTRIC TERATOMA IN AN INFANT. *(E.)* Agarwal, V. K.; Parashar, S. K.; Srivastava, S. K. (G. R. Med. Coll., Gwalior, India). *Indian J. Surg.* 34(2):87-88, 1972.

1348 A FEW CONSIDERATIONS ON CHRONIC GASTRITIS. *(Jap.)* Iwata, T. (Kyorin Univ. Sch. Med., Tokyo). *J. Tokyo Med. Coll.* 30(2):159-162, 1972.

1349 GASTRITIS AND GASTRIC CANCER. *(E.)* Anonymous. (no affil.). *Br. Med. J.* 5809:309, 1972.

1350 CARCINOMA OF THE STOMACH: A NEW CONCEPT. *(E.)* Tolentino, W.; Smith, E. B. (St. Francis Gen. Hosp., Pittsburgh, Pa.). *J. Natl. Med. Assoc.* 64(3):222-224, 1972.

1351 GASTRIC LEIOMYOMA WITH OCCULT BLEEDING IN A CHILD OF FOURTEEN YEARS. *(E.)* Fielding, J. F.; Dowling, B. L. (Radcliffe Infirm., Oxford, England). *Br. J. Clin. Pract.* 26(5):229-230, 1972.

1352 HISTORY OF GASTRIC MASS SURVEY AND PROBLEMS IN STATISTICAL DATA COLLECTING IN JAPAN. *(E.)* Ariga, K. (Nihon Univ. Sch. Med., Tokyo, Japan). *Nihon Univ. J. Med.* 13(3):169-185, 1971.

1353 LYMPHANGIOMA OF THE STOMACH: A CASE REPORT. *(E.)* Thomas, J. A.; Kothare, S. N.; Joseph, A. J. (St. John's Med. Coll., Bangalore, India). *Indian J. Surg.* 34(3):121-122, 1972.

1354 EPIDEMIOLOGY OF CHRONIC GASTRITIS: METHODOLOGY. *(Ger.)* Wolff, G. (Robert Rossle Clin., Acad. Sci., Berlin, Germany). *Z. Aertzl. Fortbild.* 66(2):95-97, 1972.

1355 CYSTIC HAMARTOMA OF THE STOMACH WALL. *(Ger.)* Maess, M.; Wendt, F. (Charite Hosp., Humboldt Univ., Berlin, Germany). *Zentralbl. Chir.* 97(31):1107-1111, 1972.

1356 CARCINOMA OF THE STOMACH. *(E.)* Das, M. M. (N. R. S. Med. Coll. Hosp., Calcutta, India). *J. Indian Med. Assoc.* 58(4):125-127, 1972.

1357 BENIGN TUMOURS OF THE STOMACH: REVIEW OF FOUR CASES. *(E.)* O'Connell, F. X.; McDonogh, D. (Mater Misericordiae Hosp., Dublin, Ireland). *J. Irish Med. Assoc.* 65(6):130-132, 1972.

1358 A CASE OF GASTROBRONCHIAL FISTULA. *(Kor.)* Lim, Y. E.; Choi, H. J.; Kim, C. K.; Hong, S. N. (Dep. Intern. Med., Yonsei Univ. Coll. Med., Seoul, Korea). *Korean J. Intern. Med.* 15(4):55-59, 1972.

1359 A COMPARATIVE RESISTANCE OF FUNCTIONALLY DIFFERENT AREAS OF THE STOMACH OF RATS TO THE EFFECTS OF CARCINOGENS. *(Rus.)* Arkhipov, G. N. (Inst. Nutr., Moscow, USSR). *Patol. Fiziol. Eksp. Ter.* 16(2):63-65, 1972.

1360 RAPID ELIMINATION OF A GASTRIC BEZOAR IN A PATIENT WHO HAD UNDERGONE GASTRIC RESECTION. *(It.)* Ortore, P.; Piccini, D. (Munic. Hosp., Belluno, Italy). *Quad. Radiol.* 36(3):327-337, 1971.

1361 PATHOPHYSIOLOGICAL STUDIES OF THE EFFECT OF ISOPERISTALTIC JEJUNAL INTERPOSITION IN THE TREATMENT OF INCAPACITATING DUMPING SYNDROME. *(E.)* Fenger, H. J.; Kallehauge, H. E.; Gudmand-Hoyer, E. (Rigshospital, Univ. Copenhagen, Denmark). *Scand. J. Gastroenterol.* 7(3):283-287, 1972.

1362 LYMPHOCYTE BLAST-TRANSFORMATION TEST IN VITRO IN CASES OF CHRONIC GASTRITIS. *(E.)* Salupere, V.; Nutt, H.; Jarve, E. (Central Med. Res. Lab., Tartu State Univ., USSR). *Scand. J. Gastroenterol.* 7(3):215-218, 1972.

1363 SOME UNACCOUNTED FOR ASPECTS OF CLINICO-ROENTGENOLOGICAL SEMEILOGY OF ULCEROUS FORMS IN CANCER OF THE STOMACH. *(Rus.)* Vlasov, P. V. (Sci. Res. Inst. Med. Radiol., Obninsk, USSR). *Sov. Med.* (6):89-94, 1972.

1364 CONGENITAL GASTRIC OUTLET OBSTRUCTION. *(E.)* van Horebeek, R.; Kerremans, R.; Bax, N.; Eggermont, E. (Dept. Pediat. Surg., Univ. Louvain, Belgium). *Acta Paediatr. Belg.* 26(3):175-184, 1972.

1365 A NEW OPERATION FOR THE DUMPING SYNDROME AND POST-VAGOTOMY DIARRHEA. *(E.)* Herrington, Jr., J. L.; Sawyers, J. L. (Vanderbilt Univ. Med. Ctr., Nashville, Tenn.). *Ann. Surg.* 175(5):790-801, 1972.

1366 METASTASES TO THE STOMACH WALL PRESENTING AS SIMPLE POLYPS. *(E.)* Dick, R.; Pattinson, J. N. (London Chest Hosp., England). *Br. J. Radiol.* 45(538):761-764, 1972.

1367 SUPERFICIAL STOMACH CANCERS. *(Fr.)* Liguory, C.; Capelle, P.; Lemaire, R.; Huguier, M. (St. Antoine Hosp., Paris, France). *Concours Med.* 94(24):4693-4698, 1972.

1368 ENDOSCOPIC POLYP REMOVAL ON THE STOMACH: INDICATIONS, TECHNIQUE, AND RESULTS. *(Ger.)* Seifert, E.; Elster, K. (Med. Coll., Hannover, Germany). *Dtsch Med. Wochenschr.* 97(33):1199-1203, 1972.

1369 STOMACH CANCER IN YOUNG PATIENTS. *(Ger.)* Rosch, W.; Witzel, L.; Fuchs, H. F. (Med. Clin., Univ. Erlangen, Germany). *Fortschr. Med.* 90(17):647-650, 1972.

1370 GASTRIC VOLVULUS: AN UNUSUAL CAUSE OF VOMITING IN AN INFANT. *(Dut.)* Jansen, J.; de Waal, F. C. (Acad. Hosp., Free Univ., Amsterdam, Netherlands). *Maandschr. Kindergeneeskd.* 40:106-115, 1972.

1371 HEMORRHAGIC DIATHESIS IN GASTRIC CANCER WITH DISSEMINATED METASTASES. *(Pol.)* Zalewski, H. (Pomeranian Med. Acad. Szczecin, Poland). *Pol. Tyg. Lek.* 27(4):389-390, 1972.

1372 AN UNUSUAL CASE OF SEVERE HEMATEMESIS FROM GASTRIC LEIOMYOMA. *(Gr.)* Tierris, E.; Scouras, C.; Oeconomou, K. (no affil.). *Acta Chir. Hellenica* 44(2):237-241, 1972.

1373 CRITICAL ISSUES IN GASTRODUODENAL HEMORRHAGE: THE ROLE OF VAGOTOMY AND PYLOROPLASTY. *(E.)* Vogel, T. T. (Dept. Surg., Ohio State Univ., Columbus, Ohio). *Ann. Surg.* 176(2):144-148, 1972.

1374 EARLY DIAGNOSIS OF STOMACH CANCER: ATTEMPT TO IDENTIFY AND SYSTEMATICALLY FOLLOW HIGH-RISK SUBJECTS. *(Ger.)* Thaler, H. (Wilhelmine Hosp., Vienna, Austria). *Dtsch. Med. Wochenschr.* 97(2):51-54, 1972.

1375 A CASE OF GASTRIC CANCER WITH LIVER METASTASIS SHOWING A POSITIVE SEROLOGIC TEST FOR α_1-FETOGLOBULIN. *(E.)* Ohya, F.; Makino, H.; Kuhara, H. (Nagoya City Univ. Med. Sch., Japan). *Nagoya Med. J.* 17(1/2):9-13, 1971.

1376 ARTERIOVENOUS GASTROEPIPLOIC FISTULA AFTER GASTRECTOMY. *(Fr.)* Boileau, F.; Fieve, G.; Keil, L.; Preaut, J.; Chalnot, P. (no affil.). *Ann. Med. Nancy* 11:837-846, 1972.

1377 A CASE OF REACTIVE LYMPHORETICULAR HYPERPLASMA OF THE STOMACH ERRONEOUSLY DIAGNOSED BY GASTROFIBERSCOPY AS EARLY GASTRIC CANCER. *(Kor.)* Chung, K. S.; Hong, S. H.; Chung, J. M.; Sohn, T. J.; Kwon, O. S. (Kyungpook Natl. Univ., Sch. Med., Taegu, Korea). *J. Korean Med. Assoc.* 15(3):249-254, 1972.

1378 NECROSIS OF THE STOMACH SECONDARY TO INGESTION OF CORROSIVE AGENTS: REPORT OF THREE CASES REQUIRING TOTAL GASTRECTOMY. *(E.)* Davis, L. L.; Raffensperger, J.; Novak, G. M. (Naval Hosp., St. Albans, N.Y.). *Chest* 62(1):48-51, 1972.

1379 CANCER OF THE STOMACH AND DUODENAL ULCER: REPORT OF TWO CASES WITH A DISCUSSION OF THE SIGNIFICANCE OF THIS RARE ASSOCIATION. *(E.)* Bateson, E. M. (Perth Radiol. Clin., Australia). *Clin. Radiol.* 23(2):208-212, 1972.

1380 SPONTANEOUS RUPTURE OF THE STOMACH IN AN ADULT. *(E.)* Jefferiss, C. D. (Princess Elizabeth Orthopedic Hosp., Exeter, England). *Br. J. Surg.* 59(1):79-80, 1972.

1381 CROSSING OF THE MORTALITY CURVES FOR STOMACH AND PANCREATIC CARCINOMA. *(E.)* Krain, L. S. (UCLA Med. Ctr., Los Angeles, Calif.). *Int. Surg.* 57(4):307-310, 1972.

1382 EFFECT OF SIMULTANEOUS ADMINISTRATION OF ANTICHOLINERGIC AGENT AND TRANQUILIZER ON GASTRIC ACIDITY OF HYPERACIDITY SUBJECTS. *(E.)* Sarkar, S. L.; Seal, N. C. (M.G.M. Med. Coll., Jamshedpur, India). *Indian Practitioner* 25(2):83-87, 1972.

See also, 0934, 1015, 1191, 1204, 1215, 1224, 1255, 1271, 1274, 1275, 1278, 1289, 1290, 1309, 1320, 1344, 1391, 1396, 1890, 1933, 1945, 1948, 1955

STOMACH

Peptic Ulcers

1383 INHIBITION OF GASTRIC AND DUODENAL PROTEASES IN THE TREATMENT OF HAEMORRHAGE FROM PEPTIC ULCER. I. AN EXPERIMENTAL STUDY OF BENTONITE AND OTHER PROTEASE INHIBITORS. *(E.)* Olesen, E. S. (Kommunehospital, Copenhagen, Denmark). *Scand. J. Gastroenterol.* 7(3):265-271, 1972.

Because clot lysis may depend on the action of the proteolytic enzymes, pepsin and pancreatic proteases, a study was made of gastric and pancreatic protease inhibitors which might prevent intermittent relapses common in gastric and duodenal bleeding. When pepsin and pancreatic protease concentrations were adjusted to give complete lysis of standard clots within 18 hr, lysis could be completely prevented by suitable concentrations of dextran sulfate preparations, hexametaphosphate, or a sulfated amylopectin. Inhibition of pancreatic fibrinolytic activity by human plasma, soya eluate, and egg-white was incomplete when these substances were used alone, but combinations of any 2 of these substances produced complete inhibition. Results from combined use of gastric and pancreatic protease inhibitors were poor due to their mutual antagonistic effect, but pepsin activity could be reduced and pancreatic protease inhibition maintained to some extent by using relatively high concentrations of soluble pepsin inhibitors combined with mixtures of egg-white and soya eluate. A 5% bentonite preparation reduced the peptic activity of 3-6 times its own volume of gastric juice to less than 1% and the proteolytic activity of 5 times its volume of duodenal juice to less than 5% of their initial values. Protein-containing natural food and fatty foods reduced pepsin binding to bentonite. Solutions of glucose, sucrose, lactose, and a malto-dextran preparation had no effect on pepsin binding. Since it reduced pepsin activity, bentonite had marked protective activity against ulcer induction in Shay rats.

1384 GASTRO-INTESTINAL FLORA AND DIARRHOEA AFTER VAGOTOMY. *(E.)* Tinker, J.; Hoffbrand, A. V.; Mitchison, R. S.; Tabaqchali, S.; Cox, A. G. (Dept. Surg., Univ. Witwatersrand, Johannesburg, South Africa). *S. Afr. Med. J.* 45(44):1258-1262. 1971.

Cultures of gastric and jejunal aspirates and measurements of fecal fat, free bile acids in jejunal fluid, urinary indican excretion, serum folate, and serum vitamin B_{12} were investigated in 20 patients (17 men and 3 women, aged 33-70 yr) 7 having diarrhea after vagotomy and drainage for duodenal ulcers. The hematological findings were compared with duodenal ulcer patients (20) who had not undergone surgery and in healthy controls (25). The pattern of small bowel flora was normal after vagotomy. This was consistent with the normal results of the urinary indican estimations. There was no relation between diarrhea and the bacteriological results. Steatorrhea occurred in 6 of the 7 patients with diarrhea and in only 1 of 13 without diarrhea, suggesting a relationship between diarrhea and fecal fat excretion after vagotomy and drainage. The mean serum folate and vitamin B_{12} levels of the patients after vagotomy were significantly lower than those in healthy controls. Since some of the folate levels in the duodenal ulcer controls were also subnormal, it is felt that this may be due to the diet of the ulcer patient rather than the outcome of the vagotomy operation.

1385 A SWINE STRESS ULCER MODEL. *(E.)* Norton, L.; Nolan, P.; Sales, J. E. L.; Eiseman, B. (Univ. Colorado Sch. Med., Denver, Colo.). *Ann. Surg.* 176(2):133-138, 1972.

The piglet stressed by hemorrhagic shock is a reliable animal model for stress ulcer studies. Within 72 hours after hemorrhage of 40% of blood volume 13 surviving (of 20) piglets developed gastric ulcers similar to clinical stress ulcers. Gastric acid secretion did not change consistently and is unlikely to be significant in stress ulcer formation. Juxtamucosal gastric pH decreased during shock where ulcers subsequently developed. This decrease might be the result of, not the cause of, such ulceration.

1386 INHIBITION OF GASTRIC AND DUODENAL PROTEASES IN THE TREATMENT OF HAEMORRHAGE FROM PEPTIC ULCER. II. CLINICAL OBSERVATIONS ON THE EFFECT OF BENTONITE. *(E.)* Amdrup, E.; Olesen, E. S. (Kommunehospital, Copenhagen, Denmark). *Scand. J. Gastroenterol.* 7(3):273-277, 1972.

By binding gastric and duodenal proteases, bentonite may support hemostasis in peptic ulcer bleeding. Bentonite was used to treat 93 patients with hematemesis and malena. Bleeding stopped within 24 hr in 79 cases (but recurred after treatment in 8) and continued in 14 cases. According to previous criteria, emergency operations would have been performed in 74 of the patients. Now 32 underwent elective surgery for chronic ulcer, and surgery was avoided in 13 patients with acute ulcer. Of 11 patients not operated on because of contraindications, 7 died (3 from bleeding). Bentonite seems to help in arresting acute ulcer bleeding. Careful observation is necessary, so that surgery can be performed if hemostasis fails.

1387 HYPOGLYCAEMIC RELEASE OF GASTRIN IN MAN. *(E.)* Stadil, F.; Rehfeld, J. F. (Rigshospital, Copenhagen, Denmark). *Scand. J. Gastroenterol.* 7(6):509-514, 1972.

To study the nature of the release of gastrin by insulin, 8 unoperated ulcer patients were subjected to 2 insulin tests. After administration of insulin (0.20 IU/kg i.v.) serum gastrin concentrations increased from 117 pg/ml to 162 pg/ml. No increases in serum gastrin concentrations occurred when hypoglycemia was prevented by simultaneous infusion of glucose (0.5 mg/kg/hr i.v.) with insulin. Tests were also run on 15 patients treated for duodenal or prepyloric ulcers by resection of the distal stomach without vagotomy (7 with gastroduodenostomy and 8 with gastrojejunostomy) and on 3 patients after resection of the upper part of the stomach and gastroesophagostomy for carcinoma of the cardia. Patients in the first group were tested 2 weeks to 180 months (average 63 months) after surgery and those in the second group, 1 or 2 yr after the operation. Administration of insulin to patients subjected to resection of the distal part of the stomach produced no increase in serum gastrin levels, and no difference was found between patients with gastroduodenostomies and those with gastrojejunostomies. In the remaining 3 patients, insulin induced a marked increase in serum gastrin levels in one and a slight increase in another; gastrin did not even return to its initial level in the third patient. These findings suggest that the gastrin response to insulin is caused by hypoglycemia and that it is of antral origin.

1388 PARTIAL GASTRECTOMY FOR HAEMORRAGE. *(E.)* Cocks, J. R.; Desmond, A. M.; Swynnerton, B. F.; Tanner, N. C. (St. James's Hosp., Balham, London, England). *Gut* 13(5):331-340, 1972.

An analysis was made of the mortality, morbidity, and long-term follow-up in 566 partial gastrectomies for hemorrhage from peptic ulcers. Of the 566, 248 males and 119 females required emergency surgery. The overall mortality rate for bleeding from peptic ulcers was 8.6%, increasing to 23% in patients over 80 yr old. If an emergency operation is necessary, the mortality doubles for all ages and increases from 14% on the day of admission to 52% if the operation is delayed 1 week. Postoperative and later bleeding complications occurred in 5% of patients, but in only 2.2% during the first year after surgery. Postoperative death due to recurrent bleeding occurred in 7 cases: 3 bleeding from the anastomosis; 1 from erosive gastritis, and 1 from an inadequate surgical procedure. During the years following surgery 6 surviving patients bled with stomach ulcers and 9 with erosive gastritis. In patients with dyspepsia for less than 3 months, the operative mortality was 26%. In those with dyspepsia for longer than 3 months, the operative mortality was 15%. However, regardless of the history, more than 92% of these patients have clinically satisfactory long-term results. Additional surgery was required in 6%, after which they also had clinically satisfactory results.

1389 INFLUENCE OF THE NUMBER OF PARIETAL CELLS ON RISK OF RECURRENCE AFTER TRUNCAL VAGOTOMY AND DRAINAGE FOR DUODENAL ULCER. *(E.)* Kronborg, O. (Bispebjerg Hosp., Copenhagen, Denmark). *Scand. J. Gastroenterol.* 7(5):423-431, 1972.

Relations between results of the pre- and postoperative augmented histamine test and the risk of recurrence after truncal vagotomy and drainage for duodenal ulcer were studied in 500 patients subjected to a complete follow-up. Men with a preoperative peak acid output (PAO) $\geq$46.4 meq/h had a risk of recurrence of 14% and women with a PAO $\geq$42.2 meq/h, a risk of 28%. Below these levels the risk was 1.7 and 1.1%, resp. Since patients with a delayed positive Hollander response and recurrence had a higher parietal cell mass than those with a delayed positive Hollander response, but without recurrence, it was concluded that recurrence is not only caused by an incomplete vagotomy. It is suggested that patients with duodenal ulcer and a high parietal cell mass (PAO$\geq$46.4 and 42.2) should be subjected to antrectomy and vagotomy.

1390 ROLE OF THE VAGUS IN INSULIN-MEDIATED GASTRIN RELEASE.

(E.) Hansky, J.; Soveny, C.; Korman, M. G. (Dept. Med., Monash Univ., Melbourne, Australia). *Gastroenterology* 63(3):387-391, 1972.

The serum gastrin response to insulin hypoglycemia has been assessed in 19 patients with active duodenal ulcer and 24 patients who had undergone vagotomy and pyloroplasty for duodenal ulcer 6 months to 5 yr previously. Insulin hypoglycemia produces a significant rise in serum gastrin in unoperated patients with duodenal ulcer, a smaller but significant rise after incomplete vagotomy, and no increase in gastrin after complete vagotomy. These results indicate that serum gastrin, as measured by radioimmunoassay, depends on intact vagal fibers for its release by insulin hypoglycemia.

1391 GASTRITIS AND ACID SECRETION IN PATIENTS WITH GASTRIC ULCERS AND DUODENAL ULCERS.

(E.) Aukee, S. (Central Hosp., Kuopio, Finland). *Scand. J. Gastroenterol.* 7(6):567-574, 1972.

The prevalence of gastritis in the antrum and corpus of 63 patients with gastric ulcer and 86 with duodenal ulcer (26 women, 123 men) is presented. The relation of the gastritis to acid secretion was also examined. Basal and maximal Histalog tests (1.5 mg/kg) were made. Biopsies were taken from resected specimens. In the patients with gastric ulcer the mean maximal acid output (MAO) value was 12.0 mEq/h and in those with duodenal ulcer 29 mEq/h. In patients with low MAO, the BAO was also low, but, where MAO was above 15 mEq/h, the one hr basal varied greatly. Among the gastric ulcer patients, antral and corpus gastritis was significantly more frequent than among the duodenal ulcer patients. Antral gastritis was more common than corpus gastritis in both types of ulcer. The MAO and the prevalence of antral and corpus gastritis were not dependent on either the duration of the illness or the age of the patient. The severity of antral gastritis bore no relation to the mean MAO values in the gastric or duodenal ulcer patients, but there was a negative correlation between corpus gastritis and the mean MAO values in both groups of patients. Depending upon the site of the ulcer, there was a decrease in the mean MAO values from the duodenum to the proximal part of the stomach.

1392 GLYCOPYRRONIUM BROMIDE IN THE TREATMENT OF CHRONIC GASTRIC ULCER.

(E.) Baume, P. E.; Hunt, J. H.; Piper, D. W. (Roy. North Shore Hosp., Sydney, Australia). *Gastroenterology* 63(3):399-406, 1972.

The initial healing of chronic gastric ulcer in the hospital was studied in two groups of 20 patients, one treated with bed rest and antacids as required and one given the same therapy plus glycopyrronium bromide. The anticholinergic drug, glycopyrronium bromide, accelerated the initial healing of chronic gastric ulceration in this group of hospital inpatients. It is suggested that glycopyrronium bromide given in maximum tolerated doses might be an effective addition to present inpatient therapy of chronic gastric ulceration. In a controlled, long-term study of outpatients glycopyrronium bromide protected against gastric ulcer recurrence in those patients who were not salicylate users. Patients who regularly took salicylates gained no protection against gastric ulcer recurrence from the anticholinergic drug. The protective effect of the anticholinergic agent appeared within 6 months and was sustained for 1 yr and probably for at least 2 yr.

1393 THE EFFECT OF SUB-THRESHOLD DOSES OF PENTAGASTRIN ON THE ACID RESPONSE TO INSULIN IN DUODENAL ULCER SUBJECTS BEFORE AND AFTER TRUNCAL VAGOTOMY.

(E.) Elder, J. B.; Gillespie, G.; Gillespie, I. E.; Crean, G. P.; Kay, A. W.; Campbell, E. H. G. (Manchester Roy. Infirm., England). *Clin. Sci.* 43(2):201-207, 1972.

Sub-threshold doses (0.008 µg/hr/kg or 0.032 µg/hr/kg) of pentagastrin were infused in 26 duodenal ulcer patients before (6) and after (20) vagotomy (combined with pyloroplasty in 12 cases and gastrojejunostomy in 8). No increase or decrease in gastric acid output was noted. The effect of sub-threshold doses of pentagastrin on the insulin response resulted in three distinct patterns: (1) in subjects with clearly functioning vagal pathways no increase in acid output occurred after insulin when a sub-threshold dose of pentagastrin was added; (2) patients with equivocal acid responses to insulin alone showed augmentation of acid output when given insulin and a sub-threshold pentagastrin infusion; (3) patients with no response to insulin after truncal vagotomy showed some increase in acid output to the combined agents, and in two patients criteria for a clearly positive acid response were satisfied. Thus, potentiation exists between insulin-induced cholinergic stimulation and infusion of sub-threshold doses of pentagastrin in man.

1394 SERUM GASTRIN IN DUODENAL ULCER. PART III. INFLUENCE OF VAGOTOMY AND PYLORECTOMY.

(E.) Korman, M. G.; Hansky, J.; Scott, P. R. (Dept.

Med., Monash Univ., Melbourne, Australia). *Gut* 13:39-42, 1972.

Blood gastrin levels were determined by immunoassay in 50 fasting patients (39 men and 11 women, aged 33-67 yr) who had undergone truncal vagotomy and anterior pylorectomy for duodenal ulcer and in 5 patients with active duodenal ulcer. After surgery for duodenal ulcer, fasting serum gastrin levels were higher (84±7.9 pg/ml) than in unoperated patients with duodenal ulcer (16±1.5 pg per ml). In response to a standard protein meal, the peak serum gastrin in the vagotomized group was 259±37.8 pg/ml 75 min after ingestion, a much higher response than that obtained with a standard meal plus prior atropinization in unoperated duodenal ulcer patients. These results suggest that truncal vagotomy allows release of gastrin which was previously inhibited with the vagi intact, and the temporal characteristics of the response indicate that some of this gastrin is derived from an extra-gastric source. The results also exemplify the relation between gastrin levels and the acidity of the contents bathing the gastric antrum.

1395 THE EFFECT OF VAGOTOMY ON THE HUMAN PANCREATIC RESPONSE TO DIRECT AND INDIRECT STIMULATION. *(E.)* Wormsley, K. G. (Dundee Teaching Hosp., Scotland). *Scand. J. Gastroenterol.* 7(1):85-91, 1972.

The pancreatic exocrine response to continuous i.v. infusion for 50 min with secretin and pancreozymin, and to acid in the small intestine, has been studied in 29 male patients with duodenal ulcer before and after surgery. Patients underwent either truncal vagotomy (19) or selective gastric vagotomy and pyloroplasty (10). The bicarbonate response to the hormones decreased significantly after surgery, while trypsin secretion was much less affected. The bicarbonate response to jejunal acidification also decreased after surgery although not as much as bicarbonate secretory capacity.

1396 OCCURRENCE AND PROGRESSION OF GASTRITIS IN PATIENTS OPERATED ON FOR PEPTIC ULCER. *(E.)* Aukee, S.; Krohn, K. (Central Hosp., Kuopio, Finland). *Scand. J. Gastroenterol.* 7(6):541-546, 1972.

1397 THE DETECTION AND MEASUREMENT OF GASTRIN-LIKE ACTIVITY BY BIOASSAY. *(E.)* Colin-Jones, D. G.; Lennard-Jones, J. E. (Univ. Coll. Hosp. Med. Sch., London, England). *Gut* 13(2):88-94, 1972.

1398 EFFECT OF TRUNCAL VAGOTOMY ON ACID AND PEPSIN: RESPONSE TO A CHOLINERGIC DRUG IN MAN. *(E.)* Cowley, D. J. (Hammersmith Hosp., London, England). *Gut* 13(2):99-102, 1972.

1399 BLEEDING GASTRIC ULCER: SURGICAL AND NON-SURGICAL TREATMENT OF 225 PATIENTS. *(E.)* Jensen, H. E.; Amdrup, E.; Christiansen, P.; Fenger, C.; Lindskov, J.; Nielsen, J.; Damgaard Nielsen, S. A. (Kommunehospital, Copenhagen, Denmark). *Scand. J. Gastroenterol.* 7(6):535-540, 1972.

1400 GASTRIC EMPTYING RATE AND ACID SECRETION AFTER TRUNCAL VAGOTOMY AND PYLOROPLASTY FOR DUODENAL ULCERATION. *(E.)* Kronborg, O.; Madsen, P. (Bispebjerg Hosp., Copenhagen, Denmark). *Scand. J. Gastroenterol.* 7(6):515-518, 1972.

1401 CHOLELITHIASIS AND ACUTE CHOLECYSTITIS AFTER VAGOTOMY. *(Heb.)* Riesenfeld, G. (Rothschild Munic. Govt. Hosp., Haifa, Israel). *Harefuah* 82(8):345-348, 1972.

1402 THE EFFECT OF CHLORBENZOXAMINE UPON SYMPTOMS AND HEALING OF PEPTIC ULCER: A SHORT-TERM CONTROLLED STUDY. *(E.)* Varis, K.; Nyberg, O.; Gorbatow, O.; Porsti, P.; Aukee, S.; Perttala, Y.; Spoof, M.; Siurala, M. (Meilahti Hosp., Helsinki, Finland). *Scand. J. Gastroenterol.* 7(6):547-549, 1972.

1403 ACCIDENTS OF VAGOTOMY. *(E.)* Wirthlin, L. S.; Malt, R. A. (Massachusetts Gen. Hosp., Boston). *Surg. Gynecol. Obstet.* 135(6):913-916, 1972.

1404 VAGOTOMY AND PYLOROPLASTY FOR PERFORATED PEPTIC ULCERS. *(Rus.)* Myshkin, K. I.; Syrnikov, N. G. (no affil.). *Kazan. Med. Zh.* (4):54-55, 1972.

1405 GASTROINTESTINAL EROSIONS IN WILD RATS SUBJECTED TO "SOCIAL STRESS". *(E.)* Allen, H. M. (Dept. Psychol., Univ. Glasgow, Scotland). *Life Sci.* [I] 11(7):351-356, 1972.

1406 THE INFLUENCE OF METOCLOPRAMIDE (PRIMPERAN^R) AND NEOSTIGMINE UPON EARLY POSTVAGOTOMY MOTOR DISTURBANCES. *(E.)* Banke, L.; Malmstrom, J.; Heltberg, J. (Bispebjerg Hosp., Copenhagen, Denmark). *Scand. J. Gastroent.* 7(1):33-37, 1972.

1407 SEQUELAE AND SYMPTOMS IN SURGICALLY AND NON-SURGICALLY TREATED PATIENTS WITH BENIGN GASTRIC ULCER: A COMPARATIVE STUDY. *(E.)* Lindskov, J.; Amdrup, E.; Christiansen, P.; Fenger, C.; Jensen, H. E.; Nielsen, J.; Damgaard Nielsen, S. A. (Kommunehospital, Copenhagen, Denmark). *Scand. J. Gastroenterol.* 7(2):137-143, 1972.

1408 FUNDAL GASTRITIS AFTER BILLROTH-II-TYPE RESECTION IN PATIENTS WITH DUODENAL ULCER. *(E.)* Nielsen, J. A.; Thaysen, E. H.; Olesen, H.; Nielsen, A. R. (Northern Hosp., Aalborg, Denmark). *Scand. J. Gastroenterol.* 7(4):337-343, 1972.

1409 RELATION OF ABO BLOOD GROUPS TO DUODENAL ULCER AND BLEEDING. *(E.)* Mitra, A. (Tagore Hosp., Dandakaranya Project, Kondagaon, Dist. Bastar, Madhya Pradesh, India). *J. Indian Med. Assoc.* 57(12): 447-449, 1971.

1410 GASTRIC ULCERATION COMPLICATING EXPERIMENTAL LIVER TRANSPLANTATION IN THE PIG. *(E.)* Dent, D. M.; Uys, C. J.; Hickman, R.; Saunders, S. J.; Terblanche, J. (Groote Schuur Hosp., Cape Town, Union South Africa). *J. Surg. Res.* 11(6):289-296, 1971.

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1412 USE OF METHYLURACIL IN THE COMBINED TREATMENT OF PATIENTS WITH PEPTIC ULCER. *(Rus.)* Danovskii, L. V. (no affil.). *Kazan. Med. Zh.* (4): 54, 1972.

1413 ANTRAL WALL FINDINGS IN GASTRIC ULCER. *(Ger.)* Liebermann-Meffert, D.; Allgower, M. (Burgerspital, Basel, Switzerland). *Dtsch. Med. Wochenschr.* 97(23):907-908, 1972.

1414 ASSOCIATIONS OF GASTRIC AND DUODENAL ULCERS. *(Ger.)* Lenz, J.; Hartel, W.; Kreckel, C.; Schuster, G. (Northwest Hosp., Frankfurt/Main, Germany). *Fortschr. Med.* 90(139):500-502, 1972.

1415 CHOLESTYRAMINE AND GASTRIC ULCER. *(E.)* Cameron, A. J.; Rovelstad, R. A.; Carlson, H. C.; Phillips, S. F. (Mayo Clin., Rochester, Minn.). *Lancet* (7757):963-964, 1972.

1416 GASTROJEJUNOSTOMY AND GASTROJEJUNAL ULCER *(E.)* Womack, N. A.; Carter, J. M.; Croom, III, R. D. (Univ. North Carolina Sch. Med., Chapel Hill). *Surg. Gynecol. Obstet.* 135(5):689-699, 1972.

1417 EXTRAGASTRIC GASTRIN. *(E.)* Korman, M. G.; Soveny, C.; Hansky, J. (Prince Henry's Hosp., Melbourne, Australia). *Gut* 13(5):346-348, 1972.

1418 COMPOSITION OF GASTRIC MUCUS IN NORMAL RATS, THOSE WITH STRESS ULCERS, AND RATS TREATED WITH 2-(*p*-METHYLSULFONYLPHENYL) IMIDAZO-[1,2-a]PYRIDINE. *(It.)* Pallavicini, G.; Cetta, G.; Calatroni, A. (Inst. Biochem., Univ. Pavia, Italy). *Bol. Soc. Ital. Biol. Sper.* 57(20):644-647, 1971.

1419 A CRESCENT-SHAPED COLLECTION OF RESIDUAL CHOLECYSTOGRAPHIC CONTRAST MATERIAL: A NEW SIGN OF BENIGN GASTRIC ULCER? *(E.)* Nelson, S. W. (Ohio State Univ. Hosp., Columbus, Ohio). *Am. J. Roentgenol. Radium Ther. Nucl. Med.* 116(2):293-303, 1972.

1420 LATE RESULTS OF THREE OPERATIONS FOR CHRONIC DUODENAL ULCER: VAGOTOMY-GASTROJEJUNOSTOMY, VAGOTOMY-HEMIGASTRECTOMY, VAGOTOMY-PYLOROPLASTY. INTERIM REPORT. *(E.)* Hoerr, S. O.; Ward, J. T. (Cleveland Clin. Fdn., Ohio). *Ann. Surg.* 176(3): 403-411, 1972.

1421 ACUTE RENAL FAILURE AS A COMPLICATION OF SURGICAL DISEASES OF THE GASTRODUODENUM. *(E.)* Sorensen, F. H.; Andersen, J. B.; Ingemar, K.; Skjoldborg, H. (Univ. Dept. Surg. Arhus Kommunehosp., Arhus, Denmark). *Acta Chir. Scand.* 138:306-311, 1972.

1422 PLASMA AND URINARY LEVELS OF 17-HYDROXYCORTICOSTEROIDS AND PEPSINOGEN IN DUODENAL ULCER PATIENTS. *(Rus.)* Lezhava, Ia. P. (Tbilisi State Med. Inst., USSR). *Soobshch. Akad. Nauk Gruzinsk. SSR* 67(1):201-204, 1972.

1423 THEORY AND PRACTICE OF SELECTIVE PROXIMAL VAGOTOMY AND PYLOROPLASTICS. (CLINICAL FOLLOWUPS ON 511 CASES FROM JAN. 1, 1964-JAN. 1, 1971. *(Ger.)* Holle, F.; Bauer, H.; Holle, G.; Klempa, I.; Konz, B.; Lissner, J.; Poetsch, H. (Surg. Polyclinic, Univ. Munich, Germany). *Bull. Soc. Int. Chir.* 31(2):90-99, 1972.

1424 "EN ETAGES" ULCERS. *(E.)* Lagache, G.; Combemale, B.; Vankemmel, M. (Univ. Hosp., Place de Verdun, Lille, France). *J. Abdominal Surg.* 14(5):84-88, 1972.

1425 RELATIONSHIP BETWEEN SMOKING HISTORY AND COMPLICATIONS IMMEDIATELY FOLLOWING SURGERY FOR DUODENAL ULCER. *(E.)* Cooper, P.; Tolins, S. H. (Bronx VA Hosp., Bronx, N.Y.). *Mt. Sinai J. Med.* 39(3):287-292, 1972.

1426 THE FUNCTIONAL STATE OF THE GASTROINTESTINAL TRACT BEFORE, AND ONE AND SIX YEARS AFTER ULCER SURGERY. *(E.)* Aukee, S.; Jussila, J. (Central Hosp., Kuopio, Finland). *Scand. J. Gastroenterol.* 7(4):329-336, 1972.

1427 EMERGENCY SURGERY FOR PATIENTS WITH ACUTE COMPLICATED PEPTIC ULCER. *(Rus.)* Mirzaev, A. P. (Leningrad Inst. Sanit. Hyg., USSR). *Sov. Med.* (6):99-104, 1972.

1428 SURGICAL TACTICS AND THE RESULTS OF TREATING GASTRODUODENAL BLEEDING. *(Rus.)* Zakharova, G. N.; Chuenkov, V. F.; Samokhin, N. A. (Saratov Med. Inst., USSR). *Sov. Med.* (6):104-108, 1972.

1429 RELATION BETWEEN ANESTHESIA AND ACUTE POSTOPERATIVE PEPTIC ULCER. *(Ger.)* Klimpel, L. (Reg. Hosp., Frankfurt/Oder, Germany). *Z. Aerztl. Fortbild.* 66(12):634-636, 1972.

1430 COMPARISON OF THE GASTRIC ACID RESPONSES TO PENTAGASTRIN AND INSULIN HYPOGLYCEMIA IN MALE AND FEMALE ULCER PATIENTS. *(E.)* Emas, S.; Borg, I. (Dept. Surg., Univ. Lund, Malmo, Sweden). *Digestion* 5(3/4):140-152, 1972.

See also, 0995, 0997, 0998, 1002, 1204, 1224, 1244, 1245, 1265, 1267, 1271, 1273, 1280, 1289, 1311, 1363, 1495, 1869

SMALL INTESTINE

1431 PRELIMINARY STUDY ON THE USE OF CAERULEIN TO TREAT PARALYTIC ILEUS. *(It.)* Agosti, A.; Paolucci, R.; Zanella, E.; Bertaccini, G. (Inst. Pharmacol., Univ. Parma, Italy). *Chir. Gastroenterol.* 6(2):117-123, 1972.

Cerulein (0.75μg/kg i.m. every 12 or 24 hr for 1-2 days) was administered to 28 patients, aged 15-86 yr, who developed severe paralytic ileus following appendectomy (3), cholecystectomy (4), gastrectomy (1), laparotomy (2), repair of inguinal hernia (2), removal of thrombus from the iliac artery (1), intestinal resection (1), removal or peritoneal metastases (3), and other extraperitoneal surgical procedures. Prior treatment had consisted of enemas (12) and enemas followed, after 24-48 hr, by prostigmine (5). In all but 4 patients vigorous peristaltic waves developed 45-90 min after administration of cerulein, and large quantities of gas were passed after 1-12 hr. Liquid stools were passed after 4-24 hr and solid stools, after 24-48 hr. Ileus resolved most rapidly in patients who had undergone extraperitoneal surgery. Side effects, which were mild in all cases, included nausea, sweating, and mild tachycardia which lasted for several minutes after injection; arterial blood pressures remained essentially unchanged.

1432 EXTRAMEDULLARY PLASMACYTOMA OF THE GASTROINTESTINAL TRACT. *(E.)* McCaffrey, J.; Kingston, C. W.; Hasker, W. E. (Repatriation Hosp., Greenslopes, Queensland, Australia). *Aust. NZ J. Surg.* 41(4):351-353, 1972.

1433 TERMINAL ILEAL KINK. *(E.)* Srivastava, R. D.; Singh, K. N. (G.S.V.M. Med. Coll., Kanpur, India). *J. Indian Med. Assoc.* 57(3):101-103, 1971.

1434 SMALL BOWELS IN IRON DEFICIENCY ANAEMIA. *(E.)* Magotra, M. L.; Tondon, B. N.; Saraya, A. K. (Armed Forces Med. Coll., Poona, India). *Indian J. Med. Res.* 59(11):1788-1795, 1971.

1435 CONGENITAL ATRESIA AND STENOSIS OF THE SMALL BOWEL. *(E.)* Mishalany, H. G. (Pediatr. Surg., American Univ., Beirut, Lebanon). *J. Abdominal Surg.* 14(5):81-83, 1972.

1436 THE ROLE OF JEJUNAL DISTENTION AND THE INITIATION OF THE DUMPING SYNDROME. *(E.)* Stahlgren, L. H.; Fronek, K. (Episcopal Hosp., Philadelphia, Pa.). *Ann. Surg.* 176(2):139-143, 1972.

1437 WHIPPLE'S DISEASE SIMULATING SARCOIDOSIS: A CASE WITH UNIQUE CLINICAL AND HISTOLOGIC FEATURES. *(E.)* Rodarte, J. R.; Garrison, C. O.; Holley, K. E.; Fontana, R. S. (Mayo Grad. Sch. Med., Univ. Minn., Rochester, Minn.). *Arch. Intern. Med.* 129(3):479-482, 1972.

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1439 RADIATION DAMAGE PRODUCED IN THE SMALL AND LARGE INTESTINES IN CARCINOMAS OF THE FEMALE GENITALIA. *(Ger.)* Reme, H. (Med. Acad., Lubeck, Germany). *Dtsch. Med. J.* 22(19):603-606, 1971.

1440 INTRAMURAL HEMATOMA OF THE DUODENUM COMPLICATING PERORAL INTESTINAL BIOPSY WITH A CROSBY CAPSULE. *(E.)* Middletown, P. H.; Jones, E. W.; Fielding, J. F. (Radcliffe Infirmary, Oxford, England). *Gastroenterology* 63(5):869-871, 1972.

1441 DIFFUSE NODULAR LIPOMATOSIS AND DIVERTICULOSIS OF THE SMALL INTESTINE. *(E.)* Ranchod, M.; French, T. J.; Novis, B. H.; Bank, S.; Marks, I. N. (Dept. Pathol., Univ. Cape Town Med. Sch., Union South Africa). *Gastroenterology* 63(4):667-671, 1972.

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1443 SUBTOTAL RESECTION OF THE SMALL INTESTINE IN A 13-YEAR-OLD BOY: 4 YEAR FOLLOW UP. *(Ger.)* Ihasz, M.; Refi, M. (Semmelweis Med. Univ., Budapest, Hungary). *Zentralbl. Chir.* 97(30):1047-1051, 1972.

1444 UNIFORMITY OF DISSECTING MICROSCOPE APPEARANCES IN PROXIMAL SMALL INTESTINE. *(E.)* Walker-Smith, J. A. (Dept. Child Health, Univ. Sydney, Australia). *Gut* 13:17-20, 1972.

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1452 DUODENAL DIVERTICULA IN THE AMPULLA OF VATER. *(Sp.)* Baravalle, N.; Baravalle, M.; Freddi, O. E. (no affil.). *An. Cir.* 36(1/2): 23-26, 1971.

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1456 FUNCTIONAL EVALUATION OF SMALL BOWEL OBSTRUCTION BY SUCCESSIVE ABDOMINAL ROENTGENOGRAMS. *(E.)* Bryk, D. (Jewish Hosp. Med. Ctr., Brooklyn, N.Y.). *Am. J. Roentgenol. Radium Ther. Nucl. Med.* 116(2):262-275, 1972.

1457 INTESTINAL MUCOSAE ENZYMATIC AND HISTOCHEMICAL CHANGES DURING INFECTIOUS DIARRHEA IN CALVES. *(E.)* Abel, Jr., J. H.; Phillips, R. W.; Lewis, L. D. (Dept. Physiol. Biophysics, Colorado State Univ., Fort Collins, Colo.). *Am. J. Dig. Dis.* 17(5):423-429, 1972.

1458 LACTOSE-BARIUM SMALL BOWEL STUDY: EFFICACY AS A SCREENING METHOD. *(E.)* Thompson, J. R.; Sanders, I. (Dept. Radiol., Loma Linda Univ., Loma Linda, Calif.). *Am. J. Roentgenol. Radium Ther. Nucl. Med.* 116(2):276-278, 1972.

1459 THE SHORT BOWEL SYNDROME. *(E.)* Conn, J. H.; Chavez, C. M.; Fain, W. R. (Univ. Mississippi Med. Ctr., Jackson, Miss.). *Ann. Surg.* 175(6):803-814, 1972.

1460 DEGENERATE VILLOUS TUMORS OF THE JEJUNUM AND ILEUM. *(Fr.)* Hillemand, P.; Roux, M.; Delavierre, P.; Muller, J. M. (Vaugirard Hosp., Paris, France). *Ann. Med. Interne* 123(6/7):623-629, 1972.

1461 PATHOPHYSIOLOGY OF MECHANICAL INTESTINAL OBSTRUCTION. *(Ger.)* Kern, E. (Surg. Clin., Univ. Wurzburg, Germany). *Wien. Klin. Wochenschr.* 84(27/28):437-442, 1972.

1462 CAUSES, CLINICAL FEATURES, AND SYMPTOMATOLOGY OF MECHANICAL ILEUS. *(Ger.)* Neumayr, A. (Empress Elizabeth Hosp., Vienna, Austria). *Wien. Klin. Wochenschr.* 84(27/28):442-446, 1972.

1463 ARTERIAL-MESENTERIC DUODENAL OBSTRUCTION. IS IT AN IDIOPATHIC OR SYMPTOMATIC CLINICAL PICTURE? *(Ger.)* Reichmann, J. (Altenburg Hosp., Germany). *Z. Aerztl. Fortbild.* 66(6):329-332, 1972.

1464 GALL STONE ILEUS. *(Ger.)* Barlehner, E.; Pfitzmann, K. F. (Munic. Clin., Berlin-Buch, Germany). *Z. Aerztl. Fortbild.* 66(9):450-455, 1972.

1465 SMALL-BOWEL TUMORS: DIAGNOSIS IN TIME. *(E.)* Harrison, R. C. (Dept. Surg., Univ. British Columbia, Canada). *Consultant* 11(12):59-60, 1971.

1466 UNUSUAL PROBLEMS IN SURGERY: MULTIPLE SMALL BOWEL PERFORATIONS: AN UNUSUAL COMPLICATION OF TRICHOBEZOAR. *(E.)* Beck, A. R.; Leichtling, J. J.; Kim, S. K. (Mt. Sinai Hosp., New York, N.Y.). *Mt. Sinai J. Med.* 39(3):293-299, 1972.

See also, 1205, 1232, 1237, 1256, 1267, 1280, 1288, 1421, 1527, 1528, 1545, 1561, 1851, 1852, 1855, 1931, 1932, 1949, 1966

1467 MALIGNANCY IN CROHN'S DISEASE. *(E.)*

Fielding, J. F.; Prior, P.; Waterhouse, J. A.; Cooke, W. T. (Gen. Hosp., Birmingham, England). *Scand. J. Gastroenterol.* 7(1):3-7, 1972.

In data collected on 295 cases of Crohn's disease malignant neoplasms appear to have particular significance not only for mortality but also for morbidity. A mortality analysis showed a higher incidence of tumors of the digestive system, particularly of the small intestine, biliary passages, and pancreas, than in the general population. A morbidity analysis also showed a highly significant excess of malignant tumors of the small intestine and pancreas. The higher incidence of primary malignancy of the small intestine compared with its low incidence in the general population suggests that Crohn's disease and cancer of the small intestine are related.

1468 REGIONAL ILEITIS, ULCERATIVE COLITIS, AND CLUBBED FINGERS. *(E.)*

Perry, P. M.; Evans, G. A.; Davies, J. D. (St. Bartholomew's Hosp., London, England). *Dis. Colon Rectum* 15(4): 278-279, 1972.

Of 73 patients with histologically proven regional ileitis, the percentage of those having clubbed fingers as compared with the site of the disease is: foregut-duodenum (5 cases) 20%, ileum only (15) 40%, terminal ileum and ascending colon (22) 40%, ascending colon only (5) 40%, hindgut disease only (5) no incidence of clubbed fingers, total colonic disease (21) 24%. Of 68 patients with regional ileitis, confined to the area of the gut supplied by the vagus nerve, 23 had clubbed fingers. The marked fibrosis in regional ileitis may be a factor in the reflex mechanism responsible for clubbing. Only 3 of 77 patients with the histologic diagnosis of ulcerative colitis (2 of 59 cases affecting the entire colon and 1 of 18 affecting the hindgut only) had clubbed fingers. Of these 3 patients, 2 had associated hepatic cirrhosis. Additionally, 8 patients with radiologic diagnosis of regional ileitis but without histologic confirmation had clubbed fingers, but no clubbed fingers were found in patients diagnosed as having ulcerative colitis without histologic confirmation. It is suggested that the clubbed fingers be used as a guide in diagnosing between regional ileitis and ulcerative colitis.

1469 CLINICAL PATHOLOGICAL INVESTIGATION OF REGIONAL ENTERITIS AS A GUIDE TO PROGNOSIS.

(E.) Gump, F. E.; Sakellariadis, P.; Wolff, M.; Broell, J. R. (Coll. Phys. Surg., Columbia Univ., New York, N.Y.). *Ann Surg.* 176(2):233-242, 1972.

A group of 64 patients (38 men, 26 women, average age 35.2 yr) with chronic regional enteritis was studied to identify clinical and pathological features associated with long-term surgical remission. Patients with ileocolitis were not considered. All had their first definitive operation, ileocolectomy, at Presbyterian Hospital, and were followed for 10-32 yr. A series of 5 clinical, 3 gross pathologic and 10 histologic features was recorded in each patient and the information was analyzed using stepwise discriminant analysis. None of the 18 individual features was significantly correlated to another. Therefore, it was possible to test each feature individually. Two of the clinical features, an increased length of involved bowel and the existence of anal complications prior to or at the time of the operation, had a statistically significant correlation with postoperative remission or recurrence. Of 12 cases having both features, 11 recurred whereas only 29 of the 64 in the total group suffered recurrence. The length of normal bowel removed above the gross disease and the age of onset of symptoms were not significant factors in postoperative recurrence. The long follow-up period (mean 17.4 yr) makes it possible to anticipate permanent surgical remission. Since neither the operative procedure nor its extent is a factor in recurrence, attention to the nature of the underlying disease will be necessary to understand better the variable results that follow surgical therapy.

1470 BACTERIOLOGICAL STUDIES IN CROHN'S DISEASE.

(E.) Vince, A.; Dyer, N. H.; O'Grady, F. W.; Dawson, A. M. (St. Bartholomew's Hosp., London, England). *J. Med. Microbiol.* 5(2):219-229, 1972.

The bacterial flora of aspirates from the stomach, upper jejunum, mid-gut and terminal ileum of 13 patients with Crohn's disease was compared with that obtained from similar sites in healthy subjects. The relation of the bacterial flora to the site of disease and to the absorption of vitamin B_{12} and fat was examined. Increased colonization of the upper gut was seen only in patients with obvious stasis due to upper-gut disease, or when the upper and lower gut were connected by a fistula. In patients with comparatively normal motility, or with disease restricted to the terminal small bowel, the flora was similar to that of healthy subjects. Aerobic diphtheroids were virtually absent in patients with Crohn's disease. They were recovered from 1 of 44 samples as compared with 39 of 85 samples in healthy subjects. The concentration of diphtheroids in saliva of ulcerative colitis patients was also reduced. Higher counts of yeasts were present in all areas of the gut of patients with Crohn's disease. A less marked increase occurred in ulcerative colitis. No consistent relation could be demonstrated between absorptive defects and the presence of an abnormal bacterial flora. Malabsorption of vitamin B_{12} usually depended more on loss or disease of the terminal ileum than on increased numbers of bacteria in the small gut. Three patients who showed significant deconjugation of bile salts had steatorrhea, but bacterial overgrowth, including species able to deconjugate bile salts, was not always associated with increased excretion of fat.

1471 FUNCTIONAL INSUFFICIENCY OF THE SMALL INTESTINE IN CROHN'S REGIONAL ENTERITIS. *(Ger.)* Lampe, K.; Schopen, R. D. (Munic. Hosp., Osnabruck, Germany). *Fortschr. Geb. Roentgenstr. Nuklearmed.* 117(3):312-316, 1972.

1472 ANTIBODIES TO EB VIRUS IN CASES OF CROHN'S DISEASE. *(E.)* Jarnerot, G.; Lantorp, K. (Linkoping Univ. Med. Sch., Sweden). *N. Engl. J. Med.* 286(22):1215-1216, 1972.

1473 CROHN'S DISEASE AND CARCINOMA OF THE RECTUM. *(E.)* Hardy, D. G.; Youngs, G. R. (London Hosp., England). *Int. Surg.* 57(6):504-506, 1972.

1474 REGIONAL ENTERITIS WITH PNEUMOPERITONEUM. *(E.)* Schussheim, A. (Long Island Jewish Med. Ctr., New Hyde Park, N.Y.). *Am. J. Dig. Dis.* 17(9):856-859, 1972.

1475 ACUTE TOXIC DILATATION LIMITED TO THE ILEUM IN CROHN'S DISEASE. *(E.)* Greene, L.; Kreusch, L.; Held, B. (Booth Mem. Med. Ctr., Queens, N.Y.). *Am. J. Dig. Dis.* 17(5):439-446, 1972.

1476 PERSPECTIVES OF CROHN'S DISEASE. *(E.)* Beeken, W. L. (Univ. Vermont, Coll. Med., Burlington). *Arq. Gastroenterol.* 9(1):1-4, 1972.

1477 RECURRENT CROHN'S DISEASE AFTER 39 YEARS. *(E.)* Cohen, W. N.; Luttwak, E. M. (Hadassah Hebrew Univ. Hosp., Jerusalem, Israel). *Br. J. Radiol.* 45:764-765, 1972.

1478 EPIDEMIOLOGY OF CROHN'S DISEASE. *(E.)* Anonymous. *Lancet* (7757):942, 1972.

1479 FREE PERFORATION OF THE SMALL INTESTINE IN REGIONAL ENTERITIS. *(Ger.)* Wagner, A.; Bauer, M. (Munic. Hosp., Nuremberg, Germany). *Dtsch. Med. Wochenschr.* 97(33):1210-1214, 1972.

1480 IMMUNOGLOBULIN DEFICIENCY AND REGIONAL ENTERITIS. *(E.)* Soltoft, J.; Petersen, L.; Kruse, P. (Copenhagen County Hosp., Hellerup, Denmark). *Scand. J. Gastroenterol.* 7(3):233-236, 1972.

1481 ULTRASTRUCTURE OF THE ILEUM IN CROHN'S DISEASE. IMMUNE LESIONS AND MASTOCYTOSIS. *(E.)* Ranlov, P.; Nielsen, H.; Wanstrup, J. (Glostrup Hosp., Copenhagen, Denmark). *Scand. J. Gastroenterol.* 7(5):471-476, 1972.

1482 THE INCIDENCE AND SIGNIFICANCE OF LIVER DYSFUNCTION IN CROHN'S DISEASE. *(E.)* Dyer, N. H.; Dawson, A. M. (St. Bartholomew's Hosp., London, England). *Digestion* 5(6):317-325, 1972.

1483 CLINICAL ASPECTS AND TREATMENT OF REGIONAL ENTERITIS (CROHN'S DISEASE). *(Ger.)* Kasper, H. (Med. Clin., Univ. Wurzburg, Germany). *Dtsch. Med. Wochenschr.* 97(21):844-849, 1972.

See also, 1527, 1579, 1584, 1587, 1611, 1616, 1623, 1624, 1626

SMALL INTESTINE

Malabsorption

1484 COELIAC DISEASE, VASCULITIS, AND CRYOGLOBULINAEMIA. *(E.)* Doe, W. F.; Evans, D.; Hobbs, J. R.; Booth, C. C. (Roy. Postgrad. Med. Sch., London, England). *Gut* 13:112-123, 1972.

The clinical, biochemical and immunological features of 4 patients with the association of adult celiac disease, vasculitis, and cryoglobulinemia were studied. In each patient the cryoglobulinemia was of the mixed type consisting of more than one immunoglobulin class. One patient had malabsorption since childhood. The mixed cryoglobulins may represent circulating immune complexes and their deposition in small vessels causes the vasculitis. Supporting evidence from immunofluorescent studies of skin biopsies was obtained from one of these patients. Celiac disease is associated with an increased incidence of altered immunity and cryoglobulinemia is a further example of this.

1485 INTRAJEJUNAL VOLATILE FATTY ACIDS IN THE STAGNANT LOOP SYNDROME. *(E.)* Chernov, A. J.; Doe, W. F.; Gompertz, D. (Roy. Postgrad. Med. Sch., London, England). *Gut* 13:103-106, 1972.

In the stagnant loop syndrome an abnormal anaerobic flora colonizes the small bowel. Anaerobic organisms are characterized by fermentation reactions leading to the production of volatile fatty acids. The intrajejunal volatile fatty acid concentrations in 11 patients with stagnant loop syndrome, each having a demonstrable anatomical lesion accounting for the small bowel stagnation, were measured. All had malabsorption of fat and/or vitamin B_{12}. In 10, overgrowth by anaerobic bacteria had been previously demonstrated. Nine normal persons and 18 patients with gastrointestinal disease [Polya gastrectomy (5), Crohn's disease (4), celiac disease (3), α-chain disease (2), tropical sprue (1), diabetic enteropathy (1), malabsorption and subtotal villous atrophy not responsive to a gluten-free diet (1), and steatorrhea of unknown cause (1)] without intestinal stasis acted as controls. Acetate and propionate concentrations were greatly increased in the patients with the stagnant loop syndrome and propionate concentrations were greatly increased in the patients with the stagnant loop syndrome and returned to normal in patients treated with antibiotics. The measurement of intrajejunal volatile fatty acid concentrations is useful as an index of overgrowth of anaerobic organisms.

1486 INTRALUMINAL FAT DIGESTION IN THE CHRONIC ALCOHOLIC. *(E.)* Roggin, G. M.; Iber, F. L.; Linscheer, W. G. (Tufts Univ. Sch. Med., Boston, Mass.). *Gut* 13:107-11, 1972.

Intraluminal fat digestion and absorption were evaluated in 15 chronic alcoholic and 9 healthy volunteer males by aspiration of a standard meal from the jejunum. All 15 had hepatomegaly but none had ascites, jaundice, endocrinopathy, or nutritional deficiency. Intraluminal bile salts were present in normal concentrations, and micellar solubilization of fatty acids and monoglycerides was within normal limits. Pancreatic lipase concentrations, however, were significantly lower in the alcoholic patients. As a consequence, hydrolysis of triglycerides was slower, resulting in abnormally low concentrations of fatty acids and micellar lipids. Recovery of lipase production toward normal was demonstrated after 4-6 weeks by repeated intubation studies. Thus, in the chronic noncirrhotic alcoholics, insufficient production of pancreatic lipase seems to be responsible for the reversible abnormality in the intraluminal digestion of fat. Fecal fat excretion was normal in most patients, indicating that fat absorption is completed more distally in the small intestine.

1487 STEATORRHEA IN PATIENTS WITH LIVER DISEASE. *(E.)* Williams, C. N.; Sidorov, J. J. (Victoria Gen. Hosp., Halifax, Nova Scotia). *Can. Med. Assoc. J.* 105(11):1143-1146, 1971.

Steatorrhea was detected in 18 of 23 consecutive liver patients (78.3%); 2 additional prior steatorrhea cases were also included. The 20 steatorrhea patients suffered concurrently from infectious hepatitis (4); serum hepatitis (1); chronic active hepatitis (3); primary biliary cirrhosis (2); Laennec's cirrhosis (7), with ascites (1), acute alcoholic hepatitis (several), and severe fibrotic changes (7); alcoholic hepatitis (2) without cirrhosis; and non-specific hepatitis (1), with severe lung disease due to fibrosing alveolitis and idiopathic portal hypertension. Malabsorption was confined to fat and fat-soluble vitamins; stool fat excretion varied from 6.1-22g/day. No histological abnormality was seen on jejunal biopsy. Serum vitamin B_{12}, D-xylose, and Schilling tests were normal, and no radiological findings associated with malabsorption were detected in the small bowel. The severity of steatorrhea was proportional to liver disease activity as reflected by the SGOT, and to the degree of obstruction as reflected by serum alkaline phosphatase and bilirubin. No correlation existed between the histological feature, activity or stage of liver disease and the degree of steatorrhea. No histological abnormality associated with the production of steatorrhea in the jejunum could be identified. It is concluded that steatorrhea is a common finding in a wide variety of acute and chronic liver diseases and cannot be attributed to a primary defect of the small bowel.

1488 ANTIGEN-ANTIBODY REACTIONS IN JEJUNAL MUCOSA IN CHILDHOOD COELIAC DISEASE AFTER GLUTEN CHALLENGE. *(E.)* Shiner, M.; Ballard, J. (Central Middlesex Hosp., London, England). *Lancet* (7762):1202-1205, 1972.

Immunofluorescence studies, using unfixed sections to demonstrate immune complexes, were carried out before and after gluten challenge on the jejunal mucosa of 12 children (5 boys and 9 girls, aged 6 months to 9 yr) with treated celiac disease and 1 child in whom this diagnosis had been excluded. Patients had been treated with a gluten free diet for 6 months to 5 yr. Gluten challenge was administered in a single dose of 20 g in 100 ml water, steamed for 20 min, given by intraduodenal tube to 2 patients and p.o. to the others. Positive staining was seen in the region of the basement membranes of villous and crypt epithelia in 10 of the 13 patients; the immunoglobulin involved was IgA. Some staining was noted in pre-challenge mucosae in inadequately treated patients. Major morphological changes occurred 15-98 hr after gluten challenge. Although eosinophil, polymorph, and mast-cell infiltration were noted before 15 hr, the increase in lymphocytes and plasma cells, endothelial hypertrophy, and the appearance of numerous collagen fibers peaked 48 hr after challenge. Ultrastructural changes in the zones below the epithelium involving basement membranes, connective tissues, endothelium, and inflammatory cells coincided with basement membrane immune reactions.

1489 ABNORMAL BILE SALT METABOLISM IN KWASHIORKOR. *(E.)* Redmond, A. O. B.; Hansen, J. D. L.; McHutchon, B. (Dept. Paediatr., Univ. Cape Town, South Africa). *S. Afr. Med. J.* 46(20):617-618, 1972.

1490 INTESTINAL LYMPHANGIECTASIA IN NEPHROSIS: A STUDY IN THE RAT. *(E.)* De Sousa, J. S.;

Cunha, A.; De Carvalho, C. (Clin. Pediatr., Univ. Lisbon, Portugal). *Arq. Gastroenterol.* 9(1):17-20, 1972.

1491 GENERALIZED GASTROINTESTINAL POLYPOSIS ASSOCIATED WITH ECTODERMAL CHANGES AND PROTEIN-LOSING ENTEROPATHY WITH A DRAMATIC RESPONSE TO PREDNISOLONE. *(E.)* Takahata, J.; Okubo, K.; Komeda, T.; Kono, T.; Fukui, I. (Uji-Obaku Hosp., Kyoto, Japan). *Digestion* 5(3/4):153-161, 1972.

1492 A SURVEY OF DIARRHEAL DISEASE IN MALNOURISHED ABORIGINAL CHILDREN. *(E.)* Walker, A. C.; Harry, J. G. (Darwin Hosp., Northern Territory, Australia). *Med. J. Aust.* 1(18):904-911, 1972.

1493 NUTRITION AND LIVER DISEASE. *(E.)* Anonymous. *Lancet* 2(7787):1132, 1972. 1132, 1972.

1494 EFFECTIVE RENIN ACTIVITY IN PLASMA OF CHILDREN WITH KWASHIORKOR. *(E.)* Kritzinger, E. E.; Kanengoni, E.; Jones, J. J. (Godfrey Huggins Sch. Med., Salisbury, Rhodesia). *Lancet* (7747):412-413, 1972.

1495 POSTGASTRECTOMY DYSENZYMATIC ENTEROPATHY. CLINICAL AND BIOCHEMICAL OBSERVATIONS ON INTESTINAL LACTASE ACTIVITY. *(Rum.)* Faur, A.; Pasculescu, G.; Ghircoiasu, T. (4th Med. Clin., Cluj, Rumania). *Med. Interna* 24(4):471-480, 1972.

1496 SIGNIFICANCE OF PRECIPITIN ANTIBODIES TO GLUTEN IN THE PATHOGENESIS OF CELIAC DISEASE. *(Ger.)* Rossipal, E. (Pediatr. Clin., Univ. Graz, Austria). *Paediatr. Paedol.* 7(3):253-258, 1972.

1497 CHRONIC MALABSORPTION IN THE CHILD. *(Fl.)* Eggermont, E.; Molla, A. M. (Catholic U., Louvain, Belgium). *T. Geneesk.* 28(16):1045-1050, 1972.

1498 DRUG INDUCED MALABSORPTION OF VITAMIN B_{12}. V. INTESTINAL pH AND ABSORPTION OF VITAMIN B_{12} DURING TREATMENT WITH PARA-AMINOSALICYLIC ACID. *(E.)* Palva, I. P.; Rytkonen, U.; Alatulkkila, M.; Palva, H. L. A. (Dept. Med., Univ. Oulu, Finland). *Scand. J. Haematol.* 9(1):5-7, 1972.

1499 MALABSORPTION SYNDROMES IN INFANCY AND CHILDHOOD. PART I. *(E.)* Ament, M. E. (Dept. Med., Univ. Washington, Seattle). *J. Pediatr.* 81(4):685-697, 1972.

1500 EXPERIMENTAL INTESTINAL MALABSORPTION STATES AND THEIR RELATION TO CLINICAL SYNDROMES. *(E.)* Robinson, J. W. L. (Hosp. Cantonal Univ., Lausanne, Switzerland). *Klin. Wochenschr.* 50(4):173-185, 1972.

1501 CHILDHOOD CELIAC DISEASE: RESPONSE OF TREATED PATIENTS TO A SMALL UNIFORM DAILY DOSE OF WHEAT GLUTEN. *(E.)* Hamilton, R. J.; McNeill, L. K. (Fac. Med. Univ. Toronto, Canada). *J. Pediatr.* 81(5):885-893, 1972.

1502 A HOLISTIC APPROACH TO THE INTERRUPTION OF THE DIARRHEA-MALABSORPTION-MALNUTRITION CYCLE. *(E.)* Luckey, T. D.; Maier, B. R. (Univ. Missouri Sch. Med., Columbia). *Am. J. Clin. Nutr.* 25(6):612-614, 1972.

1503 ENDOSCOPIC APPEARANCE OF THE JEJUNUM IN A PATIENT WITH GLUTEN-SENSITIVE ENTEROPATHY AND A GASTROJEJUNOSTOMY. *(E.)* Schwob, D.; Kleinman, M. S.; Turner, M. D. (Univ. Rochester Sch. Med. Dent., Rochester, N.Y.). *Am. J. Dig. Dis.* 17(5):430-434, 1972.

1504 ADULT CELIAC DISEASE, RETICULOSIS AND CARCINOMA. *(E.)* Pemberton, P. J. (Roy. Victoria Hosp., Belfast, N. Ireland). *Am. J. Dig. Dis.* 17(9):851-855, 1972.

1505 NUTRITIONAL STATUS AND INTESTINAL FUNCTION AMONG RURAL POPULATIONS OF THE WEST INDIES. II. BARRIO NUEVO, PUERTO RICO. *(E.)* Klipstein, F. A.; Beauchamp, I.; Corcino, J. J.; Maldonado, M.; Tomasini, J. T.; Maldonado, N.; Rubio, C.; Schenk, E. A. (Trop. Malabsorption Unit, Univ. Rochester, N.Y.). *Gastroenterology* 63(5):758-767, 1972.

1506 MALABSORPTION SYNDROME WITH IgA DEFICIENCY. *(E.)* Samuel, A. M.; Jarnum, S. (Rigshospital, Copenhagen, Denmark). *J. Indian Med. Assoc.* 57(8):290-292, 1971.

1507 NOONAN SYNDROME WITH INTESTINAL LYMPHANGIECTASIS. A METABOLIC AND ANATOMIC STUDY. *(E.)* Vallet, H. L.; Holtzapple, P. G.; Eberlein, W. R.; Yakovac, W. C.; Moshang, Jr., T.; Bongiovanni, A. M. (Children's Hosp., Philadelphia, Pa.). *J. Pediatr.* 80(2):269-274, 1972.

1508 MALABSORPTION SYNDROMES IN INFANCY AND CHILDHOOD, PART II. *(E.)* Ament, M. E. (Univ. Washington, Seattle). *J. Pediatr.* 81(5):867-884, 1972.

1509 INTESTINAL LACTASE DEFICIENCY IN AN APPARENTLY NORMAL PERUVIAN POPULATION. *(E.)* Figueroa, R. B.; Melgar, E.; Jo, N.; Garcia, O. L. (Univ. San Marcos Med. Sch., Lima, Peru). *Am. J. Dig. Dis.* 16(10):881-889, 1971.

1510 ILEAL MUCOSA IN FAMILIAL SELECTIVE VITAMIN B_{12} MALABSORPTION. *(E.)* Mackenzie, I. L.; Donaldson, R. M.; Trier, J. S.; Mathan, V. I. (Univ. Hosp., Boston, Mass.). *New Engl. J. Med.* 286(19): 1021-1025, 1972.

1511 STUDIES ON MILK INTOLERANCE: A REVIEW OF LITERATURE FOR LATIN AMERICA. *(E.)* Luyken, R. (Central Inst. Nutr. Food Res. TNO, Netherlands). *Maandschr. Kindergeneesk.* 40:89-105, 1972.

1512 EXUDATIVE GASTROENTEROPATHY IN DISEASES OF THE GASTROINTESTINAL TRACT. *(Rum.)* Runcan, V.; Gheorghescu, B.; Anghel, E.; Merculiev, E.; Jovin, G.; Vasilescu, F.; Rucareanu, I. (Ctr. Gastroenterol., Bucharest, Rumania). *Med. Interna* 24(4):461-469, 1972.

1513 INTESTINAL DISACCHARIDASES ACTIVITY IN NORMAL ADULT POPULATION IN TROPICS. *(E.)* Gupta, P. S.; Misra, R. C.; Ramachandran, K. A.; Sarin, G. S.; Chuttani, H. K. (Goa Med. Coll., Panjim-Goa, India). *J. Trop. Med. Hyg.* 74(10):225-229, 1971.

1514 THE USE OF CORTICOSTEROIDS IN CELIAC CRISIS. *(E.)* Lloyd-Still, J. D.; Grand, R. J.; Khaw, K.-T.; Shwachman, H. (The Children's Hosp. Med. Ctr., Boston, Mass.). *J. Pediatr.* 81(6): 1074-1081, 1972.

1515 INTESTINAL ABSORPTION OF AN ARGININE-CONTAINING PEPTIDE IN CYSTINURIA. *(E.)* Asatoor, A. M.; Harrison, B. D. W.; Milne, M. D.; Prosser, D. I. (Westminster Med. Sch., London, England). *Gut* 13(2):95-98, 1972.

See also, 0948, 1202, 1441, 1624, 1626, 1810, 1893, 1962

LARGE INTESTINE

1516 ULTRASTRUCTURAL AND HISTOCHEMICAL STUDIES OF MURINE MEGACOLON. *(E.)* Bolande, R. P.; Towler, W. F. (Children's Hosp., Akron, Ohio). *Am. J. Pathol.* 69(1):139-162, 1972.

Ultrastructural studies of the myenteric plexus of the colon were made in a colony of an Ls/Ls strain of mice having a piebald coat color mutation associated with a high incidence of genetically determined aganglionic megacolon. The 45 mice ranged from 16 day fetuses to 3 months old. Ultrastructural studies were histochemically supplemented by the Maillet technic and stains for acetylcholinesterase and catecholamines. The development of megacolon did not require total aganglionosis, since ostensibly aganglionic areas contained rare ganglion cells. In the distal narrowed segment, both cholinergic and adrenergic fibers in the muscularis, submucosa, and mucosa were somewhat reduced. The dilated portion showed an abrupt increase in adrenergic fibers in the mouse. These findings are related to the pathophysiology of the disorder. Increasing degenerative changes seen in myenteric plexus structures from the fetus to adult suggest that aganglionic megacolon is an abiotrophy, in which the congenitally deficient myenteric plexus is unusually predisposed to postnatal injury and degeneration.

1517 CARCINOMA AND ADENOMATOUS POLYPS OF THE COLON AND RECTUM IN BIOPSY AND ORGAN TISSUE CULTURE. *(E.)* Kalus, M. (Methodist Hosp., Houston, Tex.). *Cancer* 30(4):972-982, 1972.

Of 280 patients with histologically verified single or multiple adenomatous polyps of the colon and rectum, 212 had only polyps while 68 also had adenocarcinoma. Although both lesions were always in the resected colon, the distance between them ranged from 2-25 cm. Carcinoma *in situ* was found in 16.0% of these 280 patients; in 6.1% (13 of 212) of the patients with polyps only and in 47.0% (32 of 68) of those who also had adenocarcinoma. In the latter group carcinoma *in situ* was usually found in only one polyp while the remainder were benign. Organ cultures were made of 26 adenocarcinomas and 22 adenomatous polyps without evidence of carcinoma *in situ* using a fibrin foam matrix. After 3 weeks some cultures of benign polyps survived unchanged, but more than two-thirds developed areas of carcinoma *in situ*. The degree of cellular pleomorphism in these cultures was comparable with that in cultures of adenocarcinoma. The transition from benign to malignant cell forms occurred in several places in most cultures and the carcinoma *in situ* invaded the fibrin foam in a few. These findings suggest that adenomatous polyps may be transformed into carcinoma *in situ* and eventually into invasive carcinoma, although colonic carcinoma may also originate *de novo*.

1518 EFFECT OF ILEAL RESECTION ON BILE SALT METABOLISM IN PATIENTS WITH ILEOSTOMY FOLLOWING PROCTOCOLECTOMY. *(E.)* Percy-Robb, I. W.; Jalan, K. N.; McManus, J. P. A.; Sircus, W. (Roy. Infirmary, Edinburgh, Scotland). *Clin. Sci.* 41(5):371-382, 1971.

Bile salt metabolism was studied in the small intestine in 7 patients with ileostomy following total proctocolectomy for ulcerative colitis; 3 were also subjected to various degrees of ileal resection. The half-life of the cholic acid pool was shortened in the 3 with ileal resection. Rates of bile acid synthesis were raised in 2 of the 3, and in the third the rate was normal. Synthesis was normal (200-400 mg/day) in patients with ileostomy but with intact ileum. The increased rate of bile acid synthesis compensates completely only if interruption of entero-hepatic circulation is partial. Four of 6 patients had low bile acid concentrations in the duodenum after a fatty meal. Deoxycholic acid could not be detected in the duodenum or ileal effluent of any of the patients. Patients with ileal resection should have most of their fat intake at the first meal of the day. Use of combined bile salt therapy and dietary measures may help patients without a colon.

1519 NEWER CONCEPTS OF CANCER OF THE COLON AND RECTUM: CLINICAL EVALUATION OF A RADIOIMMUNOASSAY FOR CEA.

(E.) LeBel, J. S.; Deodhar, S. D.; Brown, C. H. (Cleveland Clin. Fdn., Ohio). *Dis. Colon Rectum* 15(2):111-115, 1972.

The diagnostic value of a radioimmunoassay for carcinoembryonic antigen (CEA) was investigated on 393 sera from patients with various diseases including carcinomas of the colon, rectum, stomach, and pancreas; chronic ulcerative colitis without histologic malignant changes; transmural colitis and/or ileitis; recticulum-cell sarcoma of the stomach; and systemic lupus erythematosus. CEA was detected in 72% of the carcinomas of colon and rectum. However, no relation was found between CEA levels and tumor size and/or staging. Of the 17 patients with chronic ulcerative colitis, 9 had positive tests for CEA, indicating a potentially malignant disease. None of these had any histological evidence of malignancy. No quantitative distinction was possible between inflammatory and malignant bowel disease. The high incidence of positive results in nongastrointestinal malignancies suggests the assay measures not only CEA but other substances as well. A large proportion of patients with chronic pulmonary, cardiac and renal diseases; diabetes mellitus; and collagen diseases also had positive CEA tests. The interpretation of this test in elderly patients with these diseases is very difficulty since the incidence of malignancies is highest in this age group.

1520 ENDOMETRIOSIS OF THE INTESTINES AND VERMIFORM APPENDIX.

(E.) Panganiban, W.; Cornog, J. L. (Dept. Pathol., Indiana Univ. Med. Ctr., Indianapolis, Ind.). *Dis. Colon Rectum* 15(4): 253-260, 1972.

Clinical and pathologic features of 29 intestinal endometriosis cases, 27 endometriosis of the appendix cases, and 4 combined cases are studied. The gastrointestinal symptoms of intestinal endometriosis were: constipation (15 cases), abdominal pain (11), narrowing of stools (4), rectal pain (4), rectal bleeding (1), flatulence (2), and diarrhea (1). Endometriosis of the vermiform appendix is usually asymptomatic and an incidental finding with pelvic endometriosis patients. Host-tissue response to ectopic endometrial tissue depends on 2 factors: location of the tissue and the functional state of the ectopic glands. Of the 33 intestinal endometriosis cases, 21 underwent resection of the bowel and all had ectopic endometrial tissue located in the smooth-muscle area with marked muscular hyperplasia producing a constricting lesion easily mistakable for a carcinoma. Of these 21, 8 had associated serosal endometrial implants, and 2 had endometrial glands in the colonic mucosa. It is suggested that mucosal involvement is the most probable cause of rectal bleeding in these patients. Associated gastrointestinal diseases found in 4 cases included adenocarcinoma (2), diverticulosis (1), and carcinoid tumor of the appendix (1). One of the adenocarcinomas orginated from the mucosa and the other, probably from endometrial tissue.

1521 HYPOLACTASIA AND THE IRRITABLE COLON. SYNDROME.

(E.) Pena, A. S.; Truelove, S. C. (Radcliffe Infirm., Oxford, England). *Scand. J. Gastroenterol.* 7(5):433-438, 1972.

Jejunal biopsy with disaccharidase assay has been performed on 81 patients with the irritable colon syndrome. Of these 81, 73 were British natives and of British stock. The 8 non-British patients were from India (3) Pakistan (1), Iraq (1), Poland (1), Crete (1), and Italy (1); seven of the 8 were hypolactasic. Nine of the 73 (12.3%) had hypolactasia, a proportion only a little higher than has been found in healthy British volunteers and in other control subjects. A small number of subjects (4) developed the irritable colon syndrome simply because of the underlying hypolactasia and responded to a lactose-free diet. In the others, hypolactasia appears to be a coincidental finding. It is concluded that hypolactasia plays only a minor role in the etiology of the irritable colon syndrome.

1522 EFFICACY OF PREOPERATIVE ANTIMICROBIAL PREPARATION OF THE BOWEL.

(E.) Nichols, R. L.; Condon, R. E.; Gorbach, S. L.; Nyhus, L. M. (Univ. Illinois Hosp., Chicago). *Ann. Surg.* 176(2): 227-232, 1972.

Alterations in the intestinal microflora of the ileum, intraabdominal colon and feces by preoperative bowel preparation were studied by direct aspiration at operation. Patients (36) randomly received mechanical preparation alone or mechanical preparation plus one of four antimicrobial regimens; a control group received no preoperative preparation. Mechanical cleansing without antibiotics removed gross feces, but did not change the micro-organisms in the lumen of the colon. Kanamycin therapy, administered for 72 hr, resulted in decreased concentrations of aerobic organisms in 3 of 6 patients but anaerobes were not affected. Neomycin, administered for periods of 16-21 hr prior to operation, alone or in combination with phthalylsulfathiazole, reduced aerobic and facultative bacteria in 5 of 6 patients but allowed persistence of anaerobes in half of them.

Neomycin and erythromycin base administered in low doses for 19 hr reduced aerobes and facultative organisms in all subjects. Anaerobes were completely suppressed in 5 of 6 patients and were present only in small numbers in the cecum and feces in the sixth patient.

1523 POSTOPERATIVE INTRAPERITONEAL ADHESIONS. *(E.)* Razdan, J. L.; Seth, S.; Srimannarayana, A. (G.S.V.M. Med. Coll., Kanpur, India). *J. Indian Med. Assoc.* 57(8):275-277, 1971.

Use of low molecular weight dextran (A), β-methasone (B), dexamethasone (C), and promethazine (D) injections i.p. in preventing peritoneal adhesions in 130 albino rats, weighing 120-150 g, was evaluated. Drug dosages per g body weight were 1 mg for (A) and 0.01 mg for (B), (C), or (D). Seven days prior to examination the abdominal wall of each dog was opened by a lower midline incision 4 cm long and the cecum withdrawn with toothless forceps. A Kelly's hemostat was completely closed across the cecum for 1 minute to cause severe damage short of late necrosis and perforation. The traumatized cecum was returned to the peritoneal cavity and closure was made. Degrees of adhesion resulting from operative damage were classified from grade 0, no adhesions, through grade 4, numerous extensive dense adhesions involving adjacent mesentery, intestine, cecum and extending to abdominal wall. Of 10 control group animals (receiving no drug before or after wounding) 8 developed grade 4 adhesions. Each of 20 rats received 1/3 of a dose of drug (A) at the injured site immediately upon wounding with the remaining 2/3 dose placed in the peritoneal cavity just prior to closing. Of these 16 developed only low grade adhesions. When 1 dose of (A) is given i.p. 3 hr before operating and a second put into the peritoneal cavity just prior to closure, adhesions of even lower grades developed. Drug (A) is free from side effects and does not interfere with abdominal wound healing.

1524 METACHRONOUS CANCER OF THE LARGE INTESTINE. *(E.)* Lockhart-Mummery, H. E.; Heald, R. J. (St. Mark's Hosp., London, England). *Dis. Colon Rectum* 15(4):261-264, 1972.

Studies of clinical data on 90 patients with primary intestinal cancers in the rectum or sigmoid area developed second cancers in the cecum and ascending colon (23), in the transverse colon (9), in the descending colon (7), in the sigmoid colon (27), and in the rectum (24). The average interval between first and second operations was 11 yr. The risk of developing second cancers increased significantly if polyps were present in the original cancer. The necessity of reporting symptoms was supported, for in 70 of 83 cases sufficiently definitive symptoms, pain, and bleeding were most common and prompted investigations leading to diagnosis. In 11 cases no symptoms existed, supporting the need for follow-up exams including sigmoidoscopy. Of patients undergoing routine follow-up treatment where second cancers were found, 70% of these were probably curable and only 30% were more advanced tumors. The data is less hopeful for patients who did not have follow-ups. All cancer operations of the large bowel should include adequate preoperative sigmoidoscopy and a double-contrast enema to demonstrate the remainder of the large bowel. Routine use of follow-up double-contrast barium-enema studies is not suggested unless the patient has symptoms.

1525 MASSIVE HEMORRHAGE FROM DIVERTICULOSIS OF THE COLON: GUIDELINES FOR THERAPY BASED ON BLEEDING PATTERNS OBSERVED IN FIFTY CASES. *(E.)* McGuire, Jr., H. H.; Haynes, Jr., B. W. (Med. Coll. Virginia, Richmond). *Ann. Surg.* 175(6):847-862, 1972.

Treatment of patients with diverticular bleeding of sufficient magnitude to require life-saving transfusions was studied (50 of 1593 diverticulosis patients). The ages of these patients ranged from 44-85 yr (average age 67.7), and there were twice as many women as men. Radiologic evidence of diverticulitis was present in 7, and this was confirmed histologically in 3 of 15 who underwent colonic resection. The site of bleeding could not be identified in 39 patients. In the remaining patients it appeared that all diverticula were equally likely to bleed, regardless of location, and that diverticula in widely separated areas of the colon could bleed simultaneously. Thus the value of attempting to locate the bleeding site is doubtful. In 70% of the cases bleeding stopped promptly when the patient went to bed, with 22% of these experiencing massive recurrences. Those continuing to bleed (30%) underwent surgery. Delay in operating or inadequate resection resulted in a mortality rate of 27%. If the patient is still bleeding actively on the first day after 2,000 cc of blood transfusions, or if on any subsequent day 1,000 cc of blood are required, surgery must be performed immediately. The only reliable and safe operation is removal of all diverticula-bearing colon. When non-bleeding diverticula are not removed, recurrences and deaths may result.

1526 MEMBRANE ANTIGENS OF HUMAN COLONIC CARCINOMA AND NON-TUMORAL COLONIC MUCOSA: RESULTS OBTAINED WITH A NEW ISOLATION METHOD. *(E.)* Rosai, J.; Tillack, T. W.; Marchesi, V. T. (Lab. Exp. Pathol., Natl. Inst. Health, Bethesda, Md.). *Int. J. Cancer* 10(2):357-367, 1972.

A new method for isolation of carcinoembryonic antigen (CEA) from colonic tumors and non-tumoral mucosa was explored in 32 surgical specimens of adenocarcinoma of the large bowel and 15 surgical specimens of non-tumoral colonic mucosa. In 10 of these 15 the non-tumoral mucosa was dissected from some of the specimens with colonic carcinoma, the dissection starting at least 5 cm distant from the gross margins of the tumor. In the other 5 there was no evidence of a malignant neoplasm. However, elsewhere in the bowel there were diverticula (3 cases), a villoglandular polyp (1), and both diverticula and a villoglandular polyp (1).

No portion with polyps was included in the tissue to be extracted. The extraction method involved: (1) preparation of a "crude membrane" fraction from a whole cell homogenate, thus avoiding most contamination with nuclear and cytoplasmic proteins and nucleic acids; (2) solubilization of the membrane glycoproteins with lithium 3,5-diiodosalicylate, thus avoiding an acid precipitation step; (3) separation of the glycoproteins from the proteins containing little or no carbohydrate by partition in a phenol-water system; (4) ethanol extraction of the glycoprotein fraction. A 10-fold increase in the amount of material obtained was realized. The preparation was relatively pure; the only significant contaminant, nucleic acid, was removed by nuclease digestion. Further support is given the claim that CEA is located on the surface of the cell. The successful isolation of a smaller amount of a glycoprotein immunologically similar to CEA from non-tumoral human adult colonic mucosa, suggests that the difference between tumoral and non-tumoral tissues may be their relative content of this antigen.

1527 TUMOR-ASSOCIATED (CEA-REACTING) ANTIGEN IN PATIENTS WITH INFLAMMATORY BOWEL DISEASE. *(E.)* Rule, A. H.; Straus, E.; Vandevoorde, J.; Janowitz, H. D. (Mt. Sinai Sch. Med., City Univ. New York). *New Engl. J. Med.* 287(1):24-26, 1972.

Radioimmunoassays for circulating carcinoembryonic antigen (CEA) were run on 27 randomly selected normal controls with no known disease and on 56 patients with ulcerative colitis (20), ulcerative proctitis (6), granulomatous colitis (9), granulomatous ileocolitis (3), or regional ileitis (18) as diagnosed by generally accepted clinical and morphological criteria. None of the patients had any evidence of cancer or renal disease. Plasma containing more than 2.5 ng/ml CEA was classified as positive. CEA positive plasma was found in 11/30 patients with granulomatous disease and in 7/26 patients with ulcerative disease; CEA was not detected in any of the normal controls. In addition, plasma from 3 additional patients was borderline, containing 1.9-2.4 ng CEA/ml. Since patients with Crohn's disease have a lower incidence of cancer, the presence of CEA may be associated with general inflammation, degenerative tissue changes, and regenerating cell products made available to the general circulation from the gut rather than associated with cancer.

1528 ROENTGENOGRAPHIC ASPECTS OF INTESTINAL ISCHEMIA. *(E.)* Smith, S. L., Tutton, R. H.; Ochsner, S. F. (Ochsner Fdn. Hosp., New Orleans, La.). *Am. J. Roentgenol. Radium Ther. Nucl. Med.* 116(2):249-255, 1972.

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1535 JUVENILE POLYPS OF THE COLON AND RECTUM. *(E.)* Franklin, R.; McSwain, B. (Vanderbilt Univ. Sch. Med., Nashville, Tenn.). *Ann. Surg.* 175(6):887-891, 1972.

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1601 FAMILIAL RECTAL PAIN. *(E.)* Mann, T. P.; Cree, J. E. (Royal Alexandra Hosp., Brighton BN1 3JN, England). *Lancet* (7758):1016-1017, 1972.

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1604 COLONOFIBEROSCOPY: A NEW AND VALUABLE DIAGNOSTIC MODALITY. *(E.)* Wolff, W. I.; Shinya, H.; Geffen, A.; Ozaktay, S. Z. (Beth Israel Med. Ctr., New York). *Am. J. Surg.* 123(2):180-184, 1972.

1605 SOLITARY ADENOMATOUS POLYPS OF THE RECTUM AND COLON. *(Fl.)* Tanghe, W. (Hosp. Heart Clin., Roeselare, Belgium). *Tijdschr. Geneeskd.* 28(16):1070-1078, 1972.

606 DIVERTICULOSIS OF THE APPENDIX. *(Ger.)* Balun, M. (Regional Hosp., Volklingen/ aar, Germany). *Fortschr. Roentgenstr.* 117(1): 05-106, 1972.

607 POLYPS IN THE COLON. *(Fl.)* Ceulemans, G.; Van Rossum, W.; Vertommen, A.; Van Baden, M; choller, J. (no affil.). *Tijdschr. Gastroenterol.* 5(3):205-226, 1972.

608 RESULTS OF TREATMENT OF CARCINOMA OF THE RECTUM. *(E.)* Hughes, E. S. R.; Milne, P. . (no affil.). *Med. J. Aust.* 1(2):65-67, 1972.

609 CARCINOMA COMPLICATED BY COLITIS. *(E.)* Payne, J. E.; Killingback, M. J. (Sydney osp., Australia). *Med. J. Aust.* 1(19):985-987, 972.

610 MALACOPLAKIA OF THE GASTROINTESTINAL TRACT. *(E.)* Ranchod, M.; Kahn, L. B. (Univ. Cape own Med. Sch., South Africa). *Arch. Pathol.* (1):90-97, 1972.

1611 BEHCET'S SYNDROME, CROHN'S DISEASE AND TOXIC MEGACOLON. *(E.)* Mir-Madjlessi, S. H.; Farmer, R. G. (Dept. Gastroentero., Cleveland Clin., Ohio). *Cleve. Clin. Q.* 39(1):49-55, 1972.

1612 ACUTE PRIMARY INVERSION OF THE CAECUM. *(E.)* Dato Salleh, H. (Dist. Hosp., Teluk Anson, Perak, Malaysia). *Aust. NZ J. Surg.* 41(4):356-358, 1972.

1613 CARCINOID TUMOURS OF THE RECTUM. *(E.)* O'Reilly, K. (Mater Misericordia Hosp., Brisbane, Australia). *Aust. NZ J. Surg.* 41(4): 358-360, 1972.

See also, 1188, 1210, 1231, 1251, 1264, 1284, 1324, 1342, 1431, 1439, 1461, 1462, 1470, 1473, 1483, 1617, 1619, 1627, 1652, 1886, 1931, 1932, 1933, 1934, 1945, 1959, 1963

LARGE INTESTINE

Ulcerative Colitis

14 ULCERATIVE DISEASE OF THE LARGE INTESTINE IN PATIENTS MORE THAN 50 YEARS OLD. *(E.)* rle, E.; Rowe, R. J. (no affil.). *Dis. Colon ctum* 15(1):33-40, 1972.

e incidence, diagnosis, indications for surgery, d surgical management of ulcerative disease of the rge intestine has been studied in 18 patients (9 n and 9 women over 50 yr old). Of the 18, 8 had anulomatous colitis, and 8 had ulcerative litis; 8 were in the sixth decade of life, 7 the seventh, and 3 in the eighth. The duration symptoms ran from 2 weeks-18 yr, with most veloping more than 3 yr prior to surgical treatnt. The most common indication for surgery was persistence of diarrhea, weight loss, anemia, akness and inability to continue normal activities pite aggressive medical therapy (13 patients). er indications were chronic anemia (11 patients), ere anorectal disease (4 patients), possible cinoma (4 patients), toxic megacolon (2 patients), sive hemorrhage (3 patients), and perforation h abscess and peritonitis (1 patient). The surgical death which occurred was in a 50-yr- man with intractable diarrhea and classical tures of toxic megacolon. During mobilization the right colon, a perforation occurred and ulted in gross fecal contamination. Bleeding m large dilated veins in the retroperitoneal area was apparently due to chronic liver disease. The patient died 5 days after right colectomy, ileostomy, and transverse colectomy. Persistent indolent fistulas, diarrhea unresponsive to usual treatment, and eccentrically located indolent anal ulcers call for proctosigmoidoscopy, barium-enema studies, and upper gastrointestinal studies. All defects of chronic malnutrition, anemia, and hypoproteinemia must be corrected before surgery. Total colectomy and ileostomy are recommended.

1615 SPONTANEOUS ISCHAEMIC PROTOCOLITIS. *(E.)* Parks, T. G.; Johnston, G. W.; Kennedy, T. L.; Gough, A. D. (Roy. Victoria Hosp., Belfast, N. Ireland). *Scand. J. Gastroenterol.* 7(3):241-246, 1972.

Clinical data on 20 cases of spontaneous large bowel ischemia, found in an 8 yr period, are reviewed. These included 1 patient with involvement of the right side of the colon, and 1 with a rectosigmoid lesion. The preponderance of females affected is unusual. Of the 20 patients, 2 developed recurrent episodes of ischemia. Due to rapid resolution in many cases, the importance of early plain X-ray, sigmoidoscopy, and barium enema is stressed. Conservative management is often sufficient, surgery is used in the rarer gangrenous variety, and where either a tight stricture or doubtful diagnosis exists. Spontaneous ischemic proctocolitis carries a low mortality, except where gangrenous.

1616 INFLAMMATORY BOWEL DISEASE: LYMPHOCYTIC RESPONSES TO NONSPECIFIC STIMULATION IN VITRO. *(E.)* Aas, J.; Huizenga, K. A.; Newcomer, A. D.; Shorter, R. G. (Mayo Clinic, Rochester, Minn.). *Scand. J. Gastroenterol.* 7(4):299-303, 1972.

Measured by deoxyuridine-^{125}I uptake, the in vitro lymphocytic response in unstimulated cultures and in phytohemagglutinin (PHA)-stimulated cultures in 7 patients with active chronic ulcerative colitis was normal, in contrast to the decreased response to Concanavidin A (Con A) stimulation. Lymphocytes from 13 patients with active Crohn's disease had increased uptake in unstimulated cultures but normal uptake in PHA- and Con A- stimulated cultures. Lymphocytes from patients with chronic ulcerative colitis and Crohn's disease showed decreased responses to PHA and Con A stimulation in the immediate postoperative period, similar to that found in patients who had surgery for conditions other than inflammatory bowel disease (hysterectomy for fibroid tumors or metrorrhagia, 3; repair of rectal prolapse, 1; colonic resection for cancer, 1; vagotomy and pyloroplasty for duodenal ulceration, 3; and cholecystectomy for cholelithiasis, 3).

1617 THE COLON MUCUS ANTIBODY. *(E.)* Gibbs, N. M.; French, L. W. (St. Luke's Hosp., Guildford, England). *J. Clin. Pathol.* 24(9): 867-869, 1971.

1618 WEEKLY CLINICOPATHOLOGICAL EXERCISES [CHRONIC ULCERATIVE COLITIS WITH LOCALIZED GIANT PSEUDO-POLYPOSIS AND COLITIS CYSTICA PROFUNDA]. *(E.)* Castleman, B.; McNeely, B. U. (no affil.). *N. Engl. J. Med.* 286(3):147-153, 1972.

1619 ULCERATIVE AND CROHN'S (GRANULOMATOUS) COLITIS. *(E.)* Schachter, H.; Kirsner, J. B. (Northwestern Univ. Med. Sch., Chicago, Ill.). *Postgrad. Med.* 51(5):175-181, 1972.

1620 PRINCIPLES OF IMMUNOSUPPRESSIVE THERAPY OF ULCERATIVE COLITIS IN CHILDHOOD. *(Ger.)* Blaker, F.; Schafer, K. H. (Pediatr. Clin., Univ. Hamburg, Germany). *Monatsschr. Kinderheilkd.* 120(6):242-245, 1972.

1621 AN ELECTRON MICROSOPIC STUDY OF INFLAMMATORY COLONIC DISEASE. *(E.)* O'Connor, J. J. (no affil.). *Dis. Colon Rectum* 15(4):265-277, 1972.

1622 PITFALLS IN THE SURGICAL MANAGEMENT OF FULMINATING ULCERATIVE COLITIS. *(E.)* Zer, M.; Wolloch, Y.; Dintsman, M. (Beilinson Hosp., Petach Tiqva, Israel). *Dis. Colon Rectum* 15(4): 280-287, 1972.

1623 A RETROSPECTIVE EPIDEMIOLOGICAL AND CLINICAL STUDY OF THE MORBIDITY OF ULCERATIVE COLITIS AND CROHN'S REGIONAL ENTERITIS. *(Ger.)* Kettner, W. (Regional Hosp., Cottbus, Germany). *Dtsch. Gesundheitsw.* 27(19):876-879, 1972.

1624 BALANCED ROUGHAGE-FREE DIET IN INTESTINAL DISEASES. *(Ger.)* Berg, G.; Wagner, H.; Weber, L. (Med. Clin., Univ. Erlangen-Nurnberg, Erlangen, Germany). *Dtsch. Med. Wochenschr.* 97(21):826-829, 1972.

1625 RECOMMENDATIONS FOR IMMUNSUPPRESSIVE THERAPY OF ULCERATIVE COLITIS. *(Ger.)* Muller-Wieland, K. (1st Med. Clin. Univ. Hamburg, Germany). *Monatsschr. Kinderheilkd.* 120(6):253-254, 1972.

1626 THE KVEIM TEST IN CROHN'S DISEASE, ULCERATIVE COLITIS, AND COELIAC DISEASE. *(E.)* Karlish, A. J.; Cox, E. V.; Hampson, F.; Hemsted, E. H. (Roy. Berkshire Hosp., Reading, England). *Lancet* (7747):438-439, 1972.

See also, 1468, 1527, 1541, 1579

PANCREAS

1627 EXAMINATION OF THE APPENDIX AT LAPAROTOMY AS A DIAGNOSTIC CLUE IN CYSTIC FIBROSIS. *(E.)* Shwachman, H.; Holsclaw, D. (Harvard Med. Sch., Boston, Mass.). *New Engl. J. Med.* 286(24): 1300-1303, 1972.

Histological examinations of appendixes removed from 14 patients 1 week to 13 yr before cystic fibrosis was diagnosed showed an increase in the number of goblet cells that extended, in some cases, to the base of the crypt. These cells were often greatly distended with mucous secretion. Eosinophilic casts may be found in the lumen of the crypt and may extrude streamers into the lumen of the appendix. There was generally little or no cellular infiltration in the lamina propria and submucosa; the muscularis was not affected. A typical case report is presented for an 11-yr-old girl who underwent

ppendectomy after a 3 yr history of recurrent
bdominal pain, cramps, and anorexia. After surgery
he patient developed a chronic productive cough
iagnosed as an allergy, and she was given hypo-
ensitization injections followed by prednisone
ver a 3-month period. A diagnostic evaluation,
ade 8 months after surgery because of the chronic
ough and continual intermittent abdominal pain,
evealed a history of rectal prolapse; bulky,
oul-smelling stools; and an excellent appetite
ombined with a failure to grow normally. The
iagnosis of cystic fibrosis was confirmed by
n abnormal quantitative pilocarpine iontophoresis
weat test. Clinical improvement followed insti-
ution of a comprehensive treatment program. There
indings indicate that the appendix is affected
n generalized mucus-gland involvement in cystic
ibrosis.

528 UNFAMILIAR ROENTGEN FINDINGS IN PANCREATIC DISEASE. *(E.)* Eaton, Jr., S. B.; Ferrucci,
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niv. Miami Sch. Med., Fla.). *Ann. Surg.* 175(5):
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30 A PECULIAR CASE OF PANCREATIC CIRRHOSIS: A RESULT OF LATENT CONGENITAL SYPHILIS?
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31 PANCREATIC TUMOR WITH DIARRHOEA, HYPOKALEMIA AND HYPOCHLORHYDRIA. *(E.)* Andersson, H.;
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derfeldt, B. (Sahlgren's Hosp., Univ. Goteborg,
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2 CONSIDERATIONS ON RESUSCITATION FROM PANCREATIC TRAUMA. *(Fr.)* Larcan, A.;
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3 EXOCRINE PANCREATIC INSUFFICIENCY, NEUTROPENIA, METAPHYSEAL DYSOSTOSIS, AND DWARFISM
WACHMAN SYNDROME). *(Ger.)* Lucking, T.; Gruttner,
(Pediatr. Clin., Univ. Hamburg, Germany). *Dtsch.*
. Wochenschr. 97(23):902-906, 1972.

4 CLINICAL ASPECTS OF THE DIAGNOSIS OF PANCREATIC DISEASES. *(Ger.)* Palme, G.;
er-Burg, J.; Petzold, D. (Med. Clin., Free Univ.,
lin, Germany). *Dtsch. Med. J.* 23(6):421-423, 1972.

HORMONAL CONTROL OF PANCREATIC ENDOCRINE AND EXOCRINE SECRETION. *(E.)* Youngs, G. (Royal Free Hosp., London, England). *Gut* 13:154-161, 1972.

1636 INTRAPANCREATIC RUPTURE OF A SPLENIC ARTERY ANEURYSM. *(Gr.)* Blatsas, G.; Polyrakis, G.; Lazarides, D. (Surg. Univ., Thessalonika, Greece). *Galenus* 14(1):135-143, 1972.

1637 PRIMARY CANCER OF THE EXOCRINE PANCREAS: REFLECTIONS BASED ON 200 CASES. *(Fr.)* Bocquet, B.; Girard, M. (Red Cross Hosp., Lyon, France). *Lyon Med.* 227(9):797-812, 1972.

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1639 NON-G CELL GASTRIN-PRODUCING TUMOURS OF THE PANCREAS. *(E.)* Vassallo, G.; Soleia, E.; Bussolati, G.; Polak, J. M.; Pearse, A. G. E. (Inst. Pathol. Anat., Univ. Pavia, Italy). *Virchows Arch. (Zellpathol).* 11:66-79, 1972.

1640 STATISTICAL STUDIES OF POSTOPERATIVE PANCREATIC NECROSIS. *(Ger.)* Goltermann, J. (Reg. Hosp., Schwerin, Germany). *Zentralbl. Chir.* 97(33):1162-1166, 1972.

1641 CASE OF A PANCREATIC CARCINOMA. *(Dut.)* van Soesbergen, R. M. (Onze Lieve Vrouwe Hosp., Amsterdam, Netherlands). *Ned. Tijdschr. Geneeskd.* 116(21):882-885, 1972.

1642 POSSIBILITIES AND LIMITATIONS OF PANCREATIC SURGERY. *(Ger.)* Peiper, H. J.; Buse, H.; Reyeros, R. (Clin. Gen. Surg., Univ. Gottingen, Germany). *Z. Allgemeinmed.* 48(19):889-893, 1972.

1643 EXOCRINE PANCREATIC INSUFFICIENCY: CURRENT CONCEPTS OF PATHOPHYSIOLOGY. *(E.)* DiMagno, E. P.; Go, V. L. W. (Mayo Clin., Rochester, Minn.). *Postgrad. Med.* 52(1):135-140, 1972.

1644 ENZYME REPLACEMENT THERAPY IN THE PANCREATIC DUCT LIGATED SWINE. *(E.)* Imondi, A. R.; Stradley, R. P.; Wolgemuth, R. (Warren-Teed Pharmaceuticals, Columbus, Ohio). *Proc. Soc. Exp. Biol. Med.* 141(1):367-372, 1972.

1645 PSEUDOCYST OF THE PANCREAS. *(E.)* Kemp, D. R. (Alfred Hosp., Melbourne, Australia). *Aust. NZ J. Surg.* 41(4):345-350, 1972.

1646 MASSIVE ASCITES DUE TO PANCREATIC STONES. *(E.)* Nambiar, R. (Gen. Hosp., Singapore). *Aust. NZ J. Surg.* 41(4):342-345, 1972.

1647 PANCREATODUODENAL RESECTION AND TREATMENT OF PERIAMPULLAR ZONE CANCER. *(E.)* Shalimov, A. A. (no affil.). *Bull. Soc. Int. Chir.* 31(2):100-102, 1972.

1648 SARCOIDOSIS OF THE PANCREAS. *(E.)* Chaun, H.; King, D. M.; Gofton, J. P.; Sutherland, W. H.; Bogoch, A. (Shaughnessy,Hosp., Vancouver, British Columbia, Canada). *Am. J. Dig. Dis.* 17(8):725-730, 1972.

1649 PRIMARY PANCREATIC HYDATIDOSIS. *(Sp.)* Enriquez Gonzalez, L.; Perezagua Clamagirand, C.; Vara Torbeck, C.; Bautista Gallo, A. (Dept. Surg. Pathol., Madrid, Spain). *Rev. Esp. Enferm. Apar. Dig.* 36(4):377-388, 1972.

1650 PANCREATIC ENDOCRINE-EXOCRINE RELATIONSHIPS IN HEALTH AND DISEASE. *(E.)* Bank, S. (no affil.). *Scand. J. Gastroenterol.* 7(6):503-507, 1972.

1651 PANCREATICODUODENECTOMY FOR PERIAMPULLARY TUMOURS. *(E.)* Dencker, H. (Dept. Surg., Univ. Lund, Sweden). *Acta Chir. Scand.* 138:293-300, 1972.

See also, 1187, 1189, 1190, 1214, 1229, 1233, 1234, 1235, 1239, 1240, 1242, 1247, 1253, 1254, 1257, 1258, 1261, 1269, 1270, 1272, 1281, 1288, 1381, 1486, 1670, 1809, 1886, 1892, 1954

PANCREAS

Pancreatitis

1652 LESIONS OF THE COLON FOLLOWING ACUTE PANCREATITIS. *(E.)* Lindahl, F.; Vejlsted, H.; Backer, O. G. (Frederiksberg Hosp., Copenhagen, Denmark). *Scand. J. Gastroenterol.* 7(4):375-378, 1972.

In 22 patients with acute pancreatitis, 4 showed changes of the colonic pattern on plain x-rays of the abdomen. One developed a reversible stenotic lesion of the splenic flexure. By a series of barium enemas the pathogenesis of the lesion was traced from early spastic, probably reflex-released changes, through mucosal changes possibly due to lymph stasis, ending in a stenosing reversible fibrosis. Of the 22 patients who had scout films of the abdomen, colon involvement was revealed in 4, and it is suggested that these radiologic changes may be more common than previously appreciated. Stenotic lesions of the splenic flexure were reversible when conservative therapy was used.

1653 FREQUENCY OF DIABETES AFTER ACUTE PANCREATITIS. *(E.)* Johansen, K.; Ornsholt, J. (Aarhus Univ. Sch. Med., Denmark). *Metabolism* 21(4):291-296, 1972.

Studies were made on 22 patients (12 women 22-52 yr old, mean age 35 yr; and 10 men 23-55 yr old, mean age 40 yr) who were hospitalized for severe pain associated with either diastasuria or pancreatitis found during laparotomy. The investigation was made 7-48 months after their last attack of pancreatitis. The cause was listed as gallstones (11), alcoholism (4), biliary tract infection (1), gastroduodenitis (1), postgastrectomy (1), typhus (1), and unknown (4). One patient had 2 episodes. Non-diabetic subjects had normal insulin response to 100 g glucose with a rapid initial rise and peak value 1-2 hr after ingestion followed by a rapid decline. Diabetes developed in 4 of 17 patients under age 50 after acute pancreatitis, a significantly higher frequency than that (1.6%) found in the general population. In 3 of these 4 cases, glucose intolerance was so mild that the patients' fasting blood glucose was normal. Glucose intolerance was manifested only by abnormal glucose tolerance tests. The remaining patient, a 32-yr-old man, had severe glucose intolerance and a flat insulin curve as is seen in classical juvenile diabetes. Symptoms responded well to treatment with diet and tolbutamide. None of the patients with abnormal glucose tolerance had abnormal liver function as evaluated by serum bilirubin, SGOT, SGPT, thymol, and alkaline phosphatase.

1654 PANCREATITIS IN PREGNANCY. *(E.)* Corlett, R. C.; Mishell, D. R. (Univ. Southern California, Med. Ctr., Los Angeles). *Am. J. Obstet. Gynecol.* 113(3):281-290, 1972.

During a 6-yr period 52 patients, aged 16-37 yr, developed pancreatitis either while pregnant or in the first 6 weeks post partum. During this 6 yr period there were 55,416 births so that the incidence of pancreatitis was 1/1,066. Parity ranged from 0-10, with a mean of 2.2. The first attack occurred in the first trimester (14), second (10), third (18), and in puerperium (9). Of the 52, 13 had severe pancreatitis; 6 had associated cholelithiasis and 9 had recurrences during this gestation. One patient presented initially in diabetic ketoacidosis. Of the 52, 16 cases were classified as moderate pancreatitis and 23 as mild. The cause in most cases was unknown, but gallbladder disease was present in a considerable number of patients. Several patients were receiving oral diuretics at the time of onset, but the disease was attributed to diuretics in only 2 patients who had been receiving the drugs for a long time. Complications included hypocalcemia (1) and visible jaundice (3). Seven were totally without pain or tenderness, and another 7 had minimal pain and no abdominal tenderness. All cases with severe disease had marked or moderate enzyme elevation while the mild cases did not. Early diagnosis and rapid treatment in this series permitted the survival of all mothers and a corrected fetal survival rate of 89%. This high survival rate is attributable to the fact that only 2 or 3 patients had hemorrhagic pancreatitis and many had mild forms of the disease. This series indicates that pancreatitis may develop at any time during pregnancy, although it is most common in the third trimester; the disease is not more common among primiparas; and the commonest known cause is primary gallbladder disease although the cause in most cases is unknown.

1655 RESPIRATORY INSUFFICIENCY SECONDARY TO ACUTE PANCREATITIS. *(E.)* Kellum, Jr., J. M.; DeMeester, T. R.; Elkins, R. C.; Zuidema, G. D. (Johns Hopkins Univ. Sch. Med., Baltimore, Md.). *Ann. Surg.* 175(5):657-662, 1972.

1656 FACTORS AFFECTING TOTAL PROTEOLYTIC ACTIVITY IN EXPERIMENTAL PANCREATITIS. *(E.)* Larmi, T. K. I. (Dept. Surg., Univ. Oulu, inland). *Bull. Soc. Int. Chir.* 31(2):121-133, 1972.

657 EFFECTS OF DIFFERENT STIMULI ON BLOOD AMYLASE LEVEL IN EXPERIMENTAL PANCREATITIS. *E.)* Ribera, M. T.; Gramatica, L.; Carreras, M.; uguet, J. (San Pablo Hosp., Barcelona, Spain). *ull. Soc. Int. Chir.* 31(2):134-141, 1972.

658 PERITONEAL DIALYSIS IN THE TREATMENT OF EXPERIMENTAL ACUTE PANCREATITIS. *(E.)* ncarani, E.; Tersigni, R.; Vincenti, R. (Univ. ome Sch. Med., Italy). *Bull. Soc. Int. Chir.* 1(2):142-145, 1972.

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60 ACUTE PANCREATITIS: PATHOPHYSIOLOGY AND MEDICAL TREATMENT. *(Sp.)* de Prado Isla, H. (Jose de San Martin Clin. Hosp., Univ. Buenos ires, Argentina). *Prensa Med. Argent.* 59(7):255-0, 1972.

61 ALCOHOL CONSUMPTION AND ACUTE PANCREATITIS IN MEN. *(E.)* Kager, L.; Lindberg, S.; ren, G. (Surg. Clin., Karolinska Inst., St. Goran's sp., Stockholm, Sweden). *Scand. J. Gastroenterol.* Suppl.15):1-38, 1972.

1662 METABOLIC AND HEMODYNAMIC CONSIDERATIONS IN PATIENTS WITH PANCREATIC PSEUDOCYST. *(E.)* Huang, T. T.; Wolma, F. J.; Fish, J. C. (Univ. Texas Med. Branch, Galveston, Tex.). *Surg. Gynecol. Obstet.* 135(4):517-520, 1972.

1663 THE EFFECT OF HOT SPRING WATER ON BLOOD AMYLASE ACTIVITY IN SPA PATIENTS WITH CHRONIC PANCREATITIS. *(Rus.)* Volosevich, N. V.; Volosevich, G. A.; Khodykin, A. V.; Tin, V. P. (Dnepropetrovsk Sci. Res. Inst. Gastroenterol., USSR). *Vrach. Delo* (7):105-107, 1972.

1664 RECURRENT PANCREATITIS DUE TO A PARATHYROID ADENOMA IN A NORMOCALCEMIC PATIENT. *(E.)* Ballon, S.; Cohen, H.; Strasberg, Z. (Jewish Gen. Hosp., Montreal, Canada). *Can. Med. Assoc. J.* 106(1):51-54, 1972.

1665 PATHOLOGY OF ALCOHOLIC PANCREATITIS: INCIDENCE, CLASSIFICATION, PATHOGENESIS. *(Ger.)* Bocker, W.; Seifert, G. (Pathol. Inst., Univ. Hamburg, Germany). *Dtsch. Med. Wochenschr.* 97(20):803-808, 1972.

1666 FATAL GASTRIC BLEEDING IN CHRONIC RECURRENT PANCREATITIS. *(Ger.)* Goltermann, J. (Regional Hosp., Schwerin, Germany). *Dtsch. Gesundheitsw.* 27(24):1136-1138, 1972.

1667 EFFECT OF GLUCAGON ON SERUM LIPASE ACTIVITY IN PANCREATITIS. *(Ger.)* Kasper, H.; Fleischer, K. (Med. Clin., Univ. Wurzburg, Germany). *Dtsch. Med. Wochenschr.* 97(30):1124-1126, 1972.

1668 THE PLACE FOR PANCREATECTOMIES IN CHRONIC PANCREATITIS. *(Fr.)* Mallet-Guy, P.; de Roissard, J. P. (no affil.). *Bull. Soc. Int. Chir.* 31(2):114-120, 1972.

1669 WOULD YOU "THINK PANCREATITIS"? *(E.)* Carey, L. C.; Corda, J.; Hermann, R.; Knight II, W. (Univ. Pittsburgh, Sch. Med., Pa.). *Patient Care* 6(10):20-43, 1972.

1670 TYPHOID PANCREATIC ABSCESS. *(E.)* Kune, G. A.; Coster, D. (Roy. Melbourne Hosp., Australia). *Med. J. Aust.* 1:417-418, 1972.

1671 MASSIVE GASTROINTESTINAL HEMORRHAGE. *(E.)* Vankemmel, M. (no affil.). *J. Abdominal Surg.* 14(5):194-197, 1972.

1672 A PRELIMINARY STUDY OF IRON ABSORPTION IN CHRONIC RELAPSING PANCREATITIS. *(E.)* Ravindran, P.; Soman, C. R.; Pai, K. N. (Inst. Med. Sci., Trivandrum, India). *J. Assoc. Physicians India* 20(4):315-320, 1972.

1673 MARGINAL POSTGANGLIONIC NEUROTOMY IN THE SURGERY OF CHRONIC PANCREATITIS. *(Fr.)*
Napalkov, P. N.; Trounin, M. A. (no affil.). *Bull. Soc. Int. Chir.* 31(2):103-107, 1972.

See also, 1196, 1214, 1253, 1254, 1261, 1263, 1269, 1281, 1634, 1635, 1643, 1647

LIVER AND BILIARY TRACT

1674 CHRONIC BUDD-CHIARI SYNDROME DUE TO OBSTRUCTION OF THE INTRAHEPATIC PORTION OF THE INFERIOR VENA CAVA. *(E.)* Datta, D. V.; Saha, S.; Singh, S. A. K.; Gupta, B. B.; Aikat, B. K.; Chugh, K. S.; Chhuttani, P. N. (Postgrad. Inst. Med. Education and Res., Chandigarh, India). *Gut* 13(5):372-378, 1972.

Clinical signs of obstruction of the intrahepatic portion of the inferior vena cava were observed in five of 11 patients with the Budd-Chiari syndrome seen during the last four years. These patients apparently formed a distinct group from the remaining six who had hepatic vein obstruction without obstruction of the vena cava, and resembled in clinical course, biochemical features, hemodynamic findings, and radiological investigations the patients described as cases of membranous obliteration of the intrahepatic portion of the inferior vena cava. These five patients were diagnosed with the help of venous catheterization, percutaneous hepatography, and hemodynamic studies. The value of distinguishing these patients from those with obstruction due to hepatic vein occlusion is important because of the difference in the prognosis and treatment. The diagnosis of inferior vena cava obstruction should be considered in all cases of Budd-Chiari syndrome.

1675 DISTINCTIVE HEPATIC CELL GLOBULES IN ADULT ALPHA-1-ANTITRYPSIN DEFICIENCY. *(E.)* DeLellis, R. A.; Balogh, K.; Merk, F. B.; Chirife, A. M. (Univ. Hosp., Boston, Mass.). *Arch. Pathol.* 94(4):308-316, 1972.

A 52-year-old woman with homozygous alpha$_1$-antitrypsin (A-1-AT) and severe panlobular emphysema plus abnormal liver function tests and distinctive morphological changes in the liver which closely resembled those seen in childhood-type cirrhosis, had intracytoplasmic globules in liver cells at peripheries of the lobules. These globules represent accumulation of A-1-AT. Globules measured 3-40μ in diameter; the larger stained positively with periodic acid-Schiff reagent, phosphotungstic acid-hematoxylin, and Masson's trichrome technique. Fluorescein-labeled sheep antihuman A-1-AT stained large and small globules selectively. Ultrastructurally, globules contained a microfibrillar substance similar to material seen in surrounding cisternae of endoplasmic reticulum. Accumulation of this material reflects defects in synthesis or export of A-1-AT from liver cells. This patient had been exposed to several potentially hepatotoxic agents: a wide variety of antibiotics; steroids; antihypertensive medications; and small amounts of ethanol.

1676 THE EFFECTS OF PHENOBARBITAL ON BILE SALTS AND BILIRUBIN IN PATIENTS WITH INTRAHEPATIC AND EXTRAHEPATIC CHOLESTASIS. *(E.)* Stiehl, A.; Thaler, M. M.; Admirand, W. H. *New Engl. J. Med.* 286(16):858-861, 1972.

In two children, one with intrahepatic biliary atresia and the other with idiopathic recurrent cholestasis, treated with phenobarbital (PB) 10 mg/kg per day) for four days, serum bile salt concentration decreased from 100-400 to 1-10 μg/ml, and pruritus disappeared. The serum bilirubin concentrations were reduced to 20-50% of pretreatment values, and the ^{131}I-Rose Bengal fecal excretion increased. In contrast, PB had no effect on serum bile salts, bilirubin, ^{131}I-Rose Bengal excretion and pruritus in a child with extrahepatic biliary atresia. Decreased serum bile salt concentrations and concomitantly increased fecal excretion of Rose Bengal in PB-treated patients suggest the barbiturate stimulates bile secretion and biliary excretion of bile salts. It may be helpful in the management of young patients with intrahepatic cholestasis. Control of pruritus and jaundice in intrahepatic atresia required continuous PB therapy. Short-term therapy is successful for benign recurrent cholestasis.

1677 IMMUNOULTRASTRUCTURAL LOCALIZATION OF ANTIMITOCHONDRIAL ANTIBODY FROM THE SERA OF PATIENTS WITH CHRONIC LIVER DISEASE. *(E.)* Knieser, M. R.; Jenis, E. H. (Walter Reed Gen. Hosp., Washington, D.C.). *Lab. Invest.* 27(4):412-417, 1972.

By indirect immunoultrastructural techniques, the anticytoplasmic antibody ("antimitochondrial" antibody) of 6 female patients (ranging from 31-69 yr of age) with chronic liver disease was specifically localized to the ribonucleoprotein of nucleoli, the outer nuclear membrane, and the rough endoplasmic reticulum. Several different animal and human tissues were examined at the light microscopic and ultrastructural levels after pretreatment with fluorescein isothiocyanate-conjugated and horseradish peroxidase-conjugated antisera, resp. This antiribonucleoprotein antibody may be directed against foreign or altered native messenger-RNA and/or ribosomal-RNA. There is a possible relationship of this antibody to the etiologic agent of viral hepatitis.

1678 STUDIES WITH RADIOACTIVE COPPER (^{64}Cu AND ^{67}Cu); THE INCORPORATION OF RADIOACTIVE COPPER INTO CAERULOPLASMIN IN WILSON'S DISEASE AND

N PRIMARY BILIARY CIRRHOSIS. *(E.)* Gibbs, K.;
alshe, J. M. (Dept. Investigative Med., Univ. Cam-
ridge, England). *Clin. Sci.* 41(3):189-202, 1971.

comparison has been made of the handling of radio-
ctive copper by 9 patients with Wilson's disease,
patients with primary biliary cirrhosis, and a
all control group. The influence of an expanded
patic pool of copper on the incorporation of radio-
tive copper into ceruloplasmin was assessed. In
Cu studies radioactivity disappears steadily from
e plasma of patients with Wilson's disease for
riods up to 296 hr. Both in patients with primary
liary cirrhosis and in controls, a well-marked
condary rise occurs as radioactive copper is
corporated into ceruloplasmin. Ceruloplasmin has
en isolated from the serum of one control subject,
e patient with primary biliary cirrhosis, and one
th Wilson's disease. Of the plasma radioactivity,
% was present in the ceruloplasmin of the control
bject and the patient with primary biliary cirrhosis;
% was found in the ceruloplasmin of the Wilson's
sease patient. In the control subjects turnover
me for liver copper was of the order of 20-30 days,
primary biliary cirrhosis it was between 600 and
0 days, and in Wilson's disease it exceeded 1800
ys. In all cases the turnover time for radioactive
pper was significantly less. Newly arrived radio-
tive copper is preferentially handled in the
esence of copper overload, and dilution of radio-
tive copper in an expanded hepatic pool of the
tal cannot alone account for the delayed incorpora-
on found in patients with Wilson's disease.

79 METABOLITE PATTERN OF ENERGY METABOLISM IN THE NORMAL LIVER OF CHILDREN. *(Ger.)*
rtels, H. (Pediatric Clin., Univ. Kiel, Germany).
in. Wochenschr. 50(6):333-335, 1972.

30 PATHOPHYSIOLOGY OF PRURITUS ASSOCIATED WITH ELEVATED BILE ACID LEVELS IN SERUM. *(E.)*
rndon, Jr., J. H. (Univ. Texas S. W. Med. Sch.,
llas). *Arch. Intern. Med.* 130(4):632-637, 1972.

31 THREE DIMENSIONAL RECONSTRUCTION OF INTRAHEPATIC BILE DUCTS IN A CASE OF
LYCYSTIC DISEASE OF THE LIVER IN AN INFANT. *(E.)*
rgensen, M. (Univ. Inst. Pathol. Anat. Copenhagen,
nmark). *Acta Pathol. Microbiol. Scand.* 80(2):
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32 TUMORS OF THE LIVER IN EARLY INFANCY: HEPATOBLASTOMA. *(E.)* Yang, S. S.; Brough,
J.; Bernstein, J. (William Beaumont Hosp., Detroit).
h. Med. 71(17):539-543, 1972.

3 TWO CASES OF ATRAUMATIC HERNIATION OF THE LIVER. *(E.)* Poe, R. H.; Schowengerdt,
G. (Cincinnati VA Hosp., Ohio). *Am. Rev. Resp.*
. 105(6):959-963, 1972.

4 PRIMARY LIVER-CELL CARCINOMA. *(E.)*
Anonymous. *Med. J. Aust.* (16):783-
, 1972.

1685 PARTIAL HEPATECTOMY CARRIED OUT BY DIGITOCLASIA: REVIEW OF 25 OPERATIONS. *(Fr.)* Clot, J. P.; Cady, J.; Diep, H.; Mercadier, M. (Pitie Hosp., Paris, France). *Ann. Chir.* 26(9/10): 497-502, 1972.

1686 CURRENT STATUS OF EXCHANGE TRANSFUSION IN FULMINANT HEPATITIS. *(E.)* Rivera, R. A. (George Washington Univ. Sch. Med., Washington, D.C.). *Med. Ann. D C* 41(5):277-280, 1972.

1687 THE CHANGING CLINICAL PATTERN OF HEPATIC ABSCESSES. *(E.)* Lee, J. F.; Block, G. E. (Univ. Chicago Hosp., Ill.). *Arch. Surg.* 104:465-470, 1972.

1688 SIGNIFICANCE OF INCREASED ALKALINE PHOSPHATASE AND LACTATE DEHYDROGENASE ACTIVITIES COINCIDENT WITH NORMAL SERUM BILIRUBIN. *(E.)* Betro, M. G. (Dunedin Public Hosp., New Zealand). *Clin. Chem.* 18(11):1427-1429, 1972.

1689 BILE ACIDS, LIVER INJURY, AND LIVER DISEASE. *(E.)* Palmer, R. H. (Univ. Chicago Pritzker Sch. Med.). *Arch. Intern. Med.* 130(4):606-617, 1972.

1690 ON THE HISTOPATHOLOGY OF LIVER AND LIVER TUMOURS IN THORIUM-DIOXIDE PATIENTS. *(E.)* Visfeldt, J.; Poulsen, H. (Kommunehosp., Copenhagen, Denmark). *Acta Pathol. Microbiol. Scand.* 80(1): 97-108, 1972.

1691 HEPATIC CHROMIUM CONTENT IN DIABETIC SUBJECTS. *(E.)* Morgan, J. M. (VA Hosp., Birmingham, Ala.). *Metabolism* 21(4):313-316, 1972.

1692 BLAST TRANSFORMATION OF LYMPHOCYTES IN CHRONIC LIVER DISEASES. *(Rus.)* Loginov, A. S.; Osokina, L. I.; Iartseva, A. M. (All-Union Sci. Res. Inst. Gastroenterol., Moscow, USSR). *Biull. Eksp. Biol. Med.* 74(8):49-52, 1972.

1693 LYMPHOBLAST TRANSFORMATION TEST IN HEPATITIS AND CIRRHOSIS. *(Sp.)* Fernandez-Nogues, F.; Castells, A.; Verdiell, J. (1st Dept. Pathol. Clin. Med., Univ. Barcelona, Spain). *Med. Clin.* 58(6):471-475, 1972.

1694 HEPATIC MANIFESTATIONS OF HYPERTHYROIDISM: 19 BIOHISTOLOGICAL OBSERVATIONS. *(Fr.)* Bourel, M.; Ferrand, B.; Murie, N.; Lenoir, P.; Simon, M. (Fac. Med. Pharm., Rennes, France). *Sem. Hop. Paris* 47(28):1860-1872, 1972.

1695 SEVERE CALCIFIED LIVER ASSOCIATED WITH LIVER CANCER: DIFFERENTIAL DIAGNOSIS OF LIVER CALCIFICATION. *(Ger.)* Weiss, B.; Horstkotte, W.; Lindemann, B.; Kohler, H. (Gen. Hosp., Hamburg-

Ochsenzoll, Germany). *Munch. Med. Wochenschr.* 114(12):538-542, 1972.

1696 PAPILLARY CARCINOMA OF THE EXTRAHEPATIC BILE DUCTS. *(E.)* Keller, R. J.; Aufses, Jr., A. H.; Khilnani, M. T. (Dept. Radiology, Mt. Sinai Hosp., New York, N.Y.). *J. Can. Assoc. Radiol.* 23:145-151, 1972.

1697 SERUM γ-GLUTAMYLTRANSPEPTIDASE IN HEPATOBILIARY DISEASES. COMPARISON WITH ALKALINE PHOSPHATASE AND ARYLAMIDASE. *(Ger.)* Schlaeger, R.; Schenzer, R.; Kattermann, R. (Med. Clin., Univ. Gottingen, Germany). *Med. Klin.* 67(15):521-526, 1972.

1698 INTERACTION OF TRICYCLIC DRUGS AND HUMAN BILE. *(E.)* Clarke, A. E.; Maritz, V. M.; Denborough, M. A. (Roy. Melbourne Hosp., Australia). *Chem. Biol. Interact.* 5(4):265-277, 1972.

1699 LIVER SCANNING AND LIVER FUNCTION IN CYSTIC FIBROSIS. *(E.)* Feigelson, J.; Pecau, Y.; Perez, R. (no affil.). *Acta Paediatr. Scand.* 61(3): 337-342, 1972.

1700 HEPATIC ARTERY ANEURYSM AS A CAUSE OF GASTROINTESTINAL BLOOD LOSS. *(E.)* Gupta, S.; Cope, V. (Roy. Manchester Children's Hosp., England). *Br. J. Radiol.* 45(538):726-728, 1972.

1701 SURGICAL TREATMENT OF CANCER OF THE INTRAHEPATIC BILE DUCTS. *(Rus.)* Linchenko, I. F. (Stavropol' Med. Inst., USSR). *Vopr. Onkol.* 18 (8):105-114, 1972.

1702 RIGHT HEPATECTOMY IN THE TREATMENT OF LIVER TRAUMA. *(E.)* Mercadier, M. P.; Clot, J.-P.; Cady, J.-P. (Hopital de la Pitie, Paris, France). *Am. J. Surg.* 124(3):353-358, 1972.

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1704 STUDIES ON NUCLEOLI AND CYTOPLASMIC FIBRILLAR BODIES OF HUMAN HEPATOCELLULAR CARCINOMAS. *(E.)* Smetana, K.; Gyorkey, F.; Gyorkey, P.; Busch, H. (Baylor Coll. Med., Houston, Tex.). *Cancer Res.* 32:925-932, 1972.

1705 EFFECT OF RIFAMPICIN ON LIVER FUNCTION IN MAN. *(E.)* Capelle, P.; Dhumeaux, D.; Mora, M.; Feldmann, G.; Berthelot, P. (INSERM U-99, Hosp. Henri Mondor, Creteil, France). *Gut* 13(5): 366-371, 1972.

1706 HUMAN LIVER TRANSPLANTATION WITH AZATHIOPRINE. *(E.)* Aune, S.; Schistad, G.; Skulberg, A. (Ulleval Hosp., Oslo, Norway). *Surg. Gynecol. Obstet.* 135(5):727-728, 1972.

1707 γ-GLUTAMYL TRANSPEPTIDASE: A CLINICAL AND EXPERIMENTAL STUDY. *(E.)* Ideo, G.; Morganti, A.; Dioguardi, N. (Ist. Patol. Med., Milan, Italy). *Digestion* 5(6):326-336, 1972.

1708 RADIONUCLIDE HEPATIC FLOW STUDY AND LIVER SCAN IN TWO CASES OF NONPARASITIC HEPATIC CYSTS. *(E.)* Lamoureux, J.; Harel, C.; Plante, R.; Archambault, L.; Lauze, S. (Univ. Montreal Sch. Med., Canada). *Am. J. Roentgenol.* 116(2):359-367, 1972.

1709 HEPATIC GLYCOGENOSES WITHOUT A KNOWN ENZYME DEFICIENCY AND WITH CLINICAL AND BIOLOGICAL FEATURES OF TYPE I CORI DISEASE. *(Fr.)* Badoual, J.; Lestradet, H.; Tichet, J.; Sanna, N.; Grenet, P. (Herold Hosp., Paris, France). *Ann. Pediatr. (Paris)* 19(6/7):507-514, 1972.

1710 MAJOR HEPATIC RESECTION FOR MALIGNANT NEOPLASMS OF THE LIVER. *(E.)* Brasfield, R. D.; Bowden, L.; McPeak, C. J. (Mem. Hosp. Cancer Allied Dis., New York, N.Y.). *Ann. Surg.* 176(2): 171-177, 1972.

1711 PHARMACOKINETICS OF CLINDAMYCIN IN DISTURBANCES OF LIVER AND KIDNEY FUNCTION. *(Ger.)* Brandl, R.; Arkenau, C.; Simon, C.; Malerczyk, V.; Eidelloth, G. (1st Med. Clin., Kiel Univ., Germany). *Dtsch. Med. Wochenschr.* 97(28): 1057-1059, 1972.

1712 BENIGN HEPATIC ADENOMA: A CASE REPORT. *(E.)* Nolasco, R. N.; Reynolds, R. M.; Kim, Y. S. (Grace Hosp., Detroit, Mich.). *Grace Hosp. Bull.* 50(1):11-16, 1972.

1713 A CASE OF DIFFUSE HEPATIC CALCIFICATION ASSOCIATED WITH POLYOSTOTIC FIBROUS DYSPLASIA. *(E.)* Pathak, R.; Dvivedi, M. S.; Khare, K. C.; Monga, J. N. (Med. Coll., Indore, India). *J. Indian Med. Assoc.* 58(4):127-131, 1972.

1714 PROGESTAGENS AND LIVER FUNCTION. *(Sp.)* Zeron Medina, F.; Arredondo Zamora, A.; Arratia Hernandez, J.; Zeron Medina, E. (Hosp. Gynecology Obstetrics, Guadalajara, Mexico). *Med. Rev. Mex.* 52(1134):287-293, 1972.

1715 PLASMA LIPIDS AND LIPOPROTEINS IN PATIENTS WITH LIVER DISEASE. *(E.)* Seidel, D. (Med. Clin. Univ. Heidelberg, Germany). *Scand. J. Gastroenterol.* 7(2):105-108, 1972.

1716 PERSPECTIVES IN THERAPUTIC PIG LIVER PERFUSIONS. *(E.)* Tygstrup, N. (Univ. Hosp., Copenhagen, Denmark). *Scand. J. Gastroenterol.* 7(5):407-409, 1972.

1717 OPERABILITY IN CHRONIC LIVER DISEASE. *(Ger.)* Bauch, K. (Reg. Hosp., Karl Marx Stadt, Germany). *Z. Aerztl. Fortbild.* 66(6):325-329, 1972.

1718 EPIDEMIOLOGICAL STUDIES OF CHRONIC LIVER DISEASES BASED ON THE DIAGNOSES LISTED ON ALL CLINICAL RECORDS IN THE GERMAN DEMOCRATIC REPUBLIC IN 1968. *(Ger.)* Jorke, D.; Wagner, M.; Reinhardt, M. (Munic. Hosp., Jena, Germany). *Z. Aerztl. Fortbild.* 66(9):471-474, 1972.

1719 LIVER TUMORS IN CHILDREN: PROBLEMS OF DIAGNOSIS AND THERAPY. *(Ger.)* Herfarth, C.; van Lessen, H. (Surg. Clin., Univ. Freiburg/ Breisgau, Germany). *Fortschr. Med.* 90(13):494-496, 1972.

720 SERUM LIPOPROTEINS IN DISEASES OF THE LIVER. *(E.)* Arvan, D. A.; Fletcher, M. . (Univ. Pennsylvania Sch. Med., Philadelphia). *nn. Clin. Lab. Sci.* 2(4):307-312, 1972.

721 THE TREATMENT OF SERIOUS TUBERCULOSIS IN THE PRESENCE OF CONCURRENT HEPATIC DISEASE. *Cz.)* Krivinka, R. (Res. Inst. Tuberculosis Respir. is., Prague, Czechoslovakia). *Stud. Pneumol. htiseol. Cecho.* 32(3/4):165-169, 1972.

1722 HEPATO LENTICULAR DEGENERATION (WILSON'S DISEASE). *(E.)* Jain, K. K.; Chopra, P. K.; Chatterjee, A. (Christian Med. Coll. and Hosp., Ludhiana, Punjab, India). *Indian Pediatr.* 9(1):40-42, 1972.

1723 PRIMARY LIVER CANCER. *(Ger.)* Heger, N.; Taubert, M.; Bayindir, S.; Benke, G. (Pathol. Inst., Justus Liebig Univ., Giessen, Germany). *Med. Welt* 23(21):773-778, 1972.

1724 STUDIES OF HEPATOPORTAL HEMODYNAMICS AND LIVER FUNCTION IN SUBJECTS WITH HEART DISEASE. *(Ger.)* Abdel Kader, M. M.; Angel, H.; Kamel, G.; El-Kemmah, B.; Abdel-Aziz, M. T.; Kinawi, M.; El-Saadani, A. M.; Erfan, A.; Madwar, K. R.; Shaheen, M. H.; Arafa, A. (Med. Fac., Univ. Cairo, Egypt). *Dtsch. Gesundheitsw.* 27(31):1458-1462, 1972.

See also, 1067, 1195, 1198, 1199, 1200, 1203, 1208, 1209, 1216, 1217, 1218, 1222, 1225, 1226, 1227, 1230, 1235, 1236, 1246, 1249, 1259, 1276, 1277, 1279, 1283, 1287, 1375, 1410, 1482, 1487, 1493, 1873, 1934, 1951, 1952, 1957, 1958, 1960, 1967, 1968, 1969

LIVER AND BILIARY TRACT

Hyperbilirubinemic States

725 DEFECTIVE BROMOSULFOPHTHALEIN CLEARANCE IN PATIENTS WITH CONSTITUTIONAL HEPATIC YSFUNCTION (GILBERT'S SYNDROME). *(E.)* Berk, P. D.; laschke, T. F.; Waggoner, J. G. (Natl. Cancer Inst., ethesda, Md.). *Gastroenterology* 63(3):472-481, 1972.

romosulfophthalein (5 mg/kg) (BSF) was administered .v. to 26 patients with Gilbert's syndrome. After 45 in the plasma BSP concentrations in 9 patients rose o 0.52-1.52 mg/100 ml (normal:<0.50 mg/100 ml). lasma BSP disappearance curves, obtained for at east 60 min after injection in 18 of the 26 patients, ncluding all 9 with abnormal 45-min retention, howed 8 of the 18 curves normal. Of the remainder, patients showed a reduced initial BSP disappearance ate indicating defective hepatic BSP uptake. In 4 thers, a different abnormal pattern suggested a efect later in the hepatic BSP transport process. f the 10 patients with abnormal BSP disappearance urves, 9 had elevated 45-min BSP retention. However, in 1 patient with defective hepatic uptake, the value at 45 min was at the upper limit of normal. Indocyanine green disappearance curves were obtained in 16 of the patients, 9 of whom had abnormal BSP studies. In contrast to the BSP results, the indocyanine green studies were normal in each case. These data indicate the defect in Gilbert's syndrome involves organic anions other than bilirubin and demonstrates the heterogeneity of the population classified under that diagnosis.

1726 THE DUBIN-JOHNSON SYNDROME: ELECTRON MICROSCOPIC OBSERVATION OF HEPATIC PIGMENT: A CASE STUDY. *(E.)* Baba, N.; Ruppert, R. D. (Ohio St. Univ., Coll. Med., Columbus). *Am. J. Clin. Pathol.* 57(3):306-310, 1972.

Pigment was found by light microscopy in a biopsy specimen of liver from a 16 yr-old male patient with the Dubin-Johnson syndrome. Under the electron microscope, the pigment corresponded to dense bodies consisting of aggregates of osmiophilic dense materials intermixed with fine granular and globular material and measuring 0.9 to 3μ in diameter. Histochemically, a strong acid phosphatase activity was present in portions of these dense bodies. The lack of appreciable concentrations of these dense bodies in the immediate vicinity of the biliary canaliculi and the distribution of the dense bodies throughout the cytoplasm of the hepatocytes suggest a defective intracellular mobility of lysosomes toward the biliary canaliculi, thus preventing release of lysosomal contents into the biliary system.

1727 THE INFLUENCE OF OROTIC ACID ON THE SERUM BILIRUBIN LEVEL OF MATURE NEWBORN. *(E.)* Schwarze, R.; Kintzel, H. W.; Hinkel, G. K. (Paediatric Hosp., Med. Acad. "Carl Gustav Carus", Dresden, DDR). *Acta Paediatr. Scand.* 60(6):705-708, 1971.

Mature newborns (52) were treated with 200 mg/day of orotic acid (later increased to 600 mg/day) from the 5th day of life. Untreated children (50) served as a control group. Mothers received no medication during parturition. No children from rhesus immunized mothers were included. Infants received mother's milk from 6 hr after birth. Contrary to premature infants, no decrease in the serum bilirubin was achieved in the mature newborn by administration of orotic acid. No side effects were observed. Orotic acid may help mature newborns only if underdeveloped glucuronyl transferase activity is present and this activity can be made fully efficient by enzyme induction. A substitution effect on the coenzyme of glucuronyl transference is suggested as a mode of action of the orotic acid.

1728 PROPHYLAXIS OF NEONATAL HYPERBILIRUBINEMIA WITH PHENOBARBITAL. *(E.)* Halpin, T. F.; Jones, A. R.; Bishop, H. L.; Lerner, S. (Memorial Hosp., Worcester, Mass.). *Obstet. Gynecol.* 40(1): 85-90, 1972.

To lower incidence and severity of neonatal jaundice, 96 mothers were each given 20 mg of phenobarbital (PB) each night, beginning at the thirty-second week of gestation. Previous reports suggest this stimulates the glucuronyl transferase system in the fetal liver and lowers the incidence of hyperbilirubinemia in the newborn. Serum bilirubin levels during the first 4 days of life were compared with those of 114 control infants. Cord blood bilirubins did not differ significantly. However, at 24, 48, 72, and 96 hr, mean serum bilirubin of PB-treated infants was significantly lower than that of untreated controls. Treatment lowered the mean neonatal bilirubin at 72 hr after birth from 8.5 to 6.4 mg %. While 24.6% of control infants had serum bilirubin levels greater than 10 mg/100 ml at 96 hr, only 7.3% of the treated infants had levels greater than 10 mg/100 ml. No significant difference in serum bilirubin occurred between breast-fed and bottle-fed infants. PB-treated females had lower serum bilirubins than did PB-treated males. Treating mothers with PB is an effective adjunct in lowering the incidence of neonatal jaundice.

1729 DISPLACEMENT OF ALBUMIN-BOUND BILIRUBIN BY FATTY ACIDS. *(E.)* Thiessen, H.; Jacobsen, J.; Brodersen, R. (Univ. Aarhus, Denmark). *Acta Paediatr. Scand.* 61(3):285-288, 1972.

1730 THE COURSE OF SOME CASES OF JAUNDICE DUE TO A GLUCOSE-6-PHOSPHATE DEHYDROGENASE DEFICIENCY (PARTIAL PEDIGREE OF A FAMILY WITH THIS ENZYME DEFICIENCY). *(Rum.)* Deleanu, E.; Gheorghiu, S.; Stoenescu, V.; Nedelcu, T. (Hosp. Obstet. Gynecol., Brasov, Rumania). *Pediatria (Bucur.)* 21(2):143-146, 1972.

1731 BLUE LIGHT IN THE TREATMENT OF HYPERBILIRUBINEMIA IN NEWBORNS. I. EXPERIMENTAL SECTION. *(Cz.)* Bradlec, K.; Mathesius, V. J.; Plch, J. (no affil.). *Cesk. Pediatr.* 27(7):355-357, 1972.

1732 INHIBITION OF BILIRUBIN CONJUGATION IN RAT LIVER SLICES BY FREE FATTY ACIDS, WITH RELEVANCE TO THE PROBLEM OF BREAST MILK JAUNDICE. *(E.)* Bevan, B. R.; Holton, J. B. (Southmead Hosp., Bristol, England). *Clin. Chim. Acta* 41:101-107, 1972.

1733 THE BILIRUBIN STORY. *(E.)* Brandt, K. H. (Munic. Hosp., Arnhem, Netherlands). *Folia Med. Neerl.* 15(3):167-176, 1972.

1734 BLOOD SUGAR CHANGES IN NEONATAL HYPERBILIRUBINAEMIA AND PHENOBARBITONE THERAPY. *(E.)* Yeung, C. Y. (Dept. Paediat., Univ. Hong Kong). *Arch. Dis. Child.* 47(252):246-249, 1972.

1735 THE EFFECT OF MATERNAL HEROIN ADDICTION ON NEONATAL JAUNDICE. *(E.)* Nathenson, G.; Cohen, M. I.; Litt, I. F.; McNamara, H. (Morrisania City Hosp., Bronx, N.Y.). *J. Pediatr.* 81(5):899-903, 1972.

1736 EFFECT OF PHENOBARBITAL TREATMENT ON HYPERBILIRUBINEMIA AND THE ALBUMIN BINDING CAPACITY IN PREMATURE INFANTS. *(Ger.)* Menzel, K.; Scholz, E. (Med. Acad. Erfurt, Germany). 65(20): 1077-1081, 1971.

See also, 1054, 1058, 1086, 1138, 1260

Nonviral Hepatitis and Hepatic Injury

1737 LAXATIVE-INDUCED CHRONIC LIVER DISEASE. *(E.)* Gjone, E.; Blomhoff, J. P.; Ritland, S.; Elgjo, K.; Husby, G. (Rikshospital, Oslo, Norway). *Scand. J. Gastroenterol.* 7(4):395-402, 1972.

Prolonged use of oxyphenisatin laxative by 5 patients over a 6 month period resulted in active chronic hepatitis in 3 and cryptogenetic cirrhosis in 2. Four were treated with prednisone and one with additional azathioprine. Symptoms were fatigue, varying degrees of jaundice, and hepatomegaly in all, esophageal varices in 2, and ascites in 1. Serum bilirubin, transaminases, and gamma-globulins were increased in all, and albumin and Normotest low in 4. Lupus erythematosus-factor test was positive in one, antinuclear factor in two, smooth muscle antibodies in one, antimitochondrial antibodies in one, and 3 had elevated serum immunoglobulin A. Liver histology was compatible with aggressive hepatitis in 3 and cirrhosis in 2. Abrupt rises in SGOT and SGPT were caused by oxyphenisatin challenges; these decreased after withdrawal. Clinical, histological, and biochemical improvement occurred when the laxative was discontinued.

1738 NONVIRAL HEPATITIS IN PATIENTS MAINTAINED BY LONG-TERM DIALYSIS. *(E.)* Bergman, L. A.; Thomas, Jr., W.; Reddy, C. R.; Ellison, M. R.; Smith, E. C.; Dunea, G. (Mt. Sinai Hosp. Med. Ctr., Chicago, Illinois). *Arch. Intern. Med.* 130:96-100, 1972.

Seven patients (4 female and 3 male aged 14-44 yr) with terminal renal disease (2), chronic glomerulonephritis (3), rapidly progressive glomerulonephritis (1), and polycystic kidneys (1) were treated 2-3 times a week for 6 hr with a dialyzer. One patient had unsuspected postnecrotic cirrhosis. Liver changes in the 7 included mild hepatitis in 6 with predominantly lymphocytic infiltration in the portal triads and scattered foci of liver cell necrosis. The histological picture was not that of viral hepatitis, and Australia antigen was not found in the serum. The inflammation was mild in 5 and moderate to severe in 1 case, and each was interpreted as nonspecific. In one case the liver was the seat of massive necrosis with extensive collapse of reticulin and mild moderate inflammation. The patient who had the most pronounced liver changes did not receive methyldopa while the other 5 did. Over 3 yr, elevated plasma transaminase levels occurred in 24 of 40 patients or 60% of those maintained by long-term hemodialysis. These changes lasted from a few weeks to several months. The SGPT elevations were moderate (80-250 U) in most cases, but SGOT levels were usually lower. It is concluded that patients maintained by long-term dialysis develop a nonspecific hepatitis associated with elevated SGPT which appears nonviral in etiology.

1739 IRREVERSIBLE LIVER DAMAGE AFTER AZATHIOPRINE. *(E.)* Zarday, Z.; Veith, F. J.; Gliedman, M. L.; Soberman, R. (Van Etten Hosp., Bronx, N.Y.). *JAMA* 222(6):690-691, 1972.

A 27-year-old woman received a renal allograft, following which immunosuppressive treatment was started, (azathioprine, 3 mg/kg i.v. and hydrocortisone 500 mg i.v. on day of surgery). Azathioprine (125 mg/day p.o.) was given for 16 months, after which the dose was decreased to 75 mg/day; therapy was continued for another 7 months. The transplanted organ functioned well. Abnormal levels of SGOT appeared 16 months after transplantation. Frank jaundice developed 6 months later. The clinical course, pathological findings, and laboratory data were compatible with drug toxicity in the liver, and azathioprine appeared to be implicated. Azathioprine was discontinued, and treatment with cyclophosphamide (50 mg/day) was initiated. The patient died of hepatic failure. It is suggested that azathioprine therapy be discontinued in similar cases with SGOT elevation and the patient be maintained on steroids until liver function returns to normal.

1740 LIVER INVOLVEMENT IN EARLY SYPHILIS. *(E.)* Sobel, H. J.; Wolf, E. H. (Beth Israel Hosp., Passaic, N.J.). *Arch. Pathol.* 93(6):565-568, 1972.

A 53-yr-old woman suffering from diarrhea for 4 days with associated weakness and temperature rise was thought to have nonspecific enterocolitis. Proctoscopic examination revealed a hyperemic, indurated, ulcerated lesion of 1 1/2 inches in diameter 1 inch above the sphincter. Laboratory examination revealed an exceedingly high alkaline phosphatase level and slightly increased SGOT level (65 u/ml). After it was discovered that the patient had been drinking large amounts of alcohol for the past few months, a diagnosis of alcoholic hepatitis was considered. The appearance of a fine maculopapular rash over the body was thought to be an allergic reaction to sulfa drugs. Barium meal examination revealed an active duodenal ulcer. Eye symptoms suggested a diagnosis of nongranulomatous uveitis of syphilitic origin. The patient then admitted having intercourse per rectum 4 weeks before onset of rectal symptoms. Liver biopsy revealed infiltration of the portal tracts by round cells and many polymorphonuclear WBC. Except for scattered foci of necrosis the parenchymal structure was unaltered; no spirochetes were found. A diagnosis of syphilitic hepatitis was confirmed by a positive VDRL test.

1741 A CASE OF HEPATIC TUBERCULOSIS TREATED WITH RIFAMPICINE. *(Fr.)* Cachin, M.; Launois, J.-P,; Neuman, M. (Cochin Hosp., Paris, France). *Sem. Hop. Paris* 47(30):1986-1989, 1971.

1742 SULFONAMIDE HEPATITIS. *(E.)* Konttinen, A.; Perasalo, J. O. S.; Eisalo, A. (Univ. Helsinki, Finland). *Acta. Med. Scand.* 191(5):389-391, 1972.

1743 TOXICITY OF A HEPATOTOXIC LAXATIVE PREPARATION IN TISSUE CULTURE AND EXCRETION IN BILE IN MAN. *(E.)* Dujovne, C. A.; Shoeman, D. W.

(Univ. Kansas Med. Ctr., Kansas City, Kans.). *Clin. Pharmacol. Ther.* 13(4):602-608, 1972.

1744 HEPATITIS, ARTHRITIS AND LUPUS CELL PHENOMENA CAUSED BY METHYLDOPA. *(E.)* Eliastam, M.; Holmes, A. W. (Rush-Presbyterian-St. Luke's Med. Ctr., Chicago, Ill.). *Am. J. Dig. Dis.* 16(11):1014-1018, 1971.

1745 HYPERSENSITIVITY HEPATITIS DUE TO PHENAZOPYRIDINE HYDROCHLORIDE. *(E.)* Goldfinger, S. E.; Marx, S. (Massachusetts Gen. Hosp., Boston). *N. Engl. J. Med.* 286(20):1090-1091, 1972.

1746 PYOGENIC ABSCESS OF THE LIVER. *(E.)* Abbruzzese, A. A. (Peter Bent Brigham Hosp., Boston, Mass.). *Am. J. Dig. Dis.* 17(9):829-830, 1972.

1747 STUDIES OF THE DIFFERENTIATION OF DIABETIC AND HEPATOGENIC FATTY LIVER. *(Ger.)* Jorke, D.; Unbehaun, G. (Munic. Hosp., Jena, Germany). *Z. Gesamte Inn. Med.* 26(21):289-291, 1970.

1748 MICROSCOPIC PATHOLOGY OF THE LIVER IN LEPROSY PATIENTS. *(E.)* Sehgal, V. N.; Tyagi, S. P.; Kumar, S.; Gupta, M. C.; Hameed, S. (Jawaharlal Nehru Med. Coll., Aligarh Muslim Univ., India). *Int. J. Dermatol.* 11(3):168-172, 1972.

1749 HEPATIC ABSCESS CAUSED BY *SALMONELLA PARATYPHI B.* *(E.)* Poon, M. C.; Sanders, M. G. (Toronto Western Hosp., Canada). *Can. Med. Assoc. J.* 107(6):529-531, 1972.

1750 HEPATIC ACTINOMYCOSIS. *(Fr.)* Betourne, C.; Coulbois, J.; Levy, R.; Deroide, J. P.; Bergue, A.; Beaufine-Ducrocq, H.; Delas, N. (Ambroise Pare Hosp., Boulogne, France). *Ann. Med. Interne (Paris)* 123(6/7):679-686, 1972.

1751 HEPATOTOXICITY OF ANTIBIOTICS. *(It.)* Pieragnoli Couture, E. (G. Ceccarini Hosp., Riccione, Italy). *G. Clin. Med.* 52(11):787-800, 1971.

1752 ATTEMPT TO PREVENT LIVER DAMAGE CAUSED BY SURGICAL TRAUMA AND ANESTHESIA. *(Ger.)* Kroll, J. L.; Warchol, J. B.; Wolowicka, L. (Med. Acad., Poznan, Poland). *Anaesthesist* 21:358-363, 1972.

1753 DRUGS AND THE LIVER. *(Ger.)* Bianchi, L.; Ohnacker, H. (Inst. Pathol., Univ. Basel, Switzerland). *Praxis* 61(25):829-835, 1972.

1754 THE EFFECTS OF PROTHIONAMID ON LIVER FUNCTION. *(Ger.)* Zankl, I.; Wiechert, E. (Provincial Hosp., Graz, Austria). *Prax. Pneumol.* 26:450-454, 1972.

See also, 1132, 1721, 1953

LIVER AND BILIARY TRACT

Acute Viral Hepatitis

1755 CELL-MEDIATED IMMUNITY IN PATIENTS POSITIVE FOR HEPATITIS-ASSOCIATED ANTIGEN. *(E.)* Dudley, F. J.; Giustino, V.; Sherlock, S. (Roy. Free Hosp., London, England). *Br. Med. J.* 4(5843):754-756, 1972.

Cell-mediated immunity to antigens prepared from both serum and liver of patients positive for hepatitis-associated antigen (HAA) was measured by using the leukocyte migration test. Altogether a study was made of 43 patients with positive liver disease: acute hepatitis (8); chronic aggressive hapatitis or cirrhosis (21); chronic persistent hepatitis (6); and carriers with no evidence of liver disease (8). Also studied were 8 with serum antibody to HAA and 13 controls. The cell-mediated immunity detected was specific for HAA or other antigenic determinants of the associated infective agent and could be found only in patients with evidence of previous contact with HAA. Cell-mediated immunity to the HAA-positive test antigens was found in all but one of the patients with acute hepatitis, in 8 of the patients with chronic aggressive hepatitis or cirrhosis, rarely in those with chronic persistent hepatitis, and in none of the healthy carriers. Cell-mediated immunity to the HAA-positive test antigen was found in only some of the patients with serum antibody to HAA and disappeared during the convalescence of 2 patients after acute hepatitis. (Perhaps the test was not sufficiently sensitive to detect weak cell-mediated immunity.) This study supports the hypothesis that the cellular immune response is important in the clearance of the infective agent from HAA-positive patients and in the pathogenesis of associated liver cell injury.

1756 COAGULATION STUDIES IN PATIENTS WITH ACUTE INFECTIOUS HEPATITIS. *(E.)* Gallus, A. S.; Lucas, C. R.; Hirsh, J. (St. Joseph's Hosp., Hamilton, Canada). *Br. J. Haematol.* 22(6):761-771, 1972.

Coagulation studies were performed on 104 hospital inpatients with acute infectious hepatitis. Patients with clinical evidence of liver failure (26) were studied separately from those without liver failure. A coagulation defect was found in 57 of the 78 patients without liver failure. This consisted of a prolonged prothrombin time and reduced levels of factors V, VII, X, and plasminogen. The defect was mild in most patients and was not associated with bleeding. A severe coagulation defect was found in all 26 patients with liver failure. Factors II, V, VII and X were markedly reduced. Factor IX was measured in too few patients and factor VIII was normal in the 4 patients in whom it was measured. Plasminogen was reduced in all patients, and a low plasma fibrinogen concentration and thrombocytopenia were found in half. One-third of the patients studied showed an increase in serum fibrin/fibrinogen degradation products. In some of these patients dissemated intravascular thrombosis may contribute to the coagulation defect. Two patients had evidence of increased fibrinolytic activity. Bleeding occurred in 60% of the patients with liver failure, and in none of the patients without liver failure. Fifteen patients with liver failure died. Nine patients with liver failure were treated with exchange transfusions during which a significant improvement of the prothrombin time and a slight reduction in platelet count was observed. Bleeding stopped during exchange transfusions in 6 of 8 patients. It is possible that the improvement of the coagulation defect during exchange transfusions contributed to improved hemostasis. Bleeding patients were also treated with platelet transfusions and fresh frozen plasma.

1757 CLINICAL AND METABOLIC STUDY OF ALCOHOLIC HYPERLIPIDAEMIA.

(E.) Chait, A.; Mancini, M.; February, A. W.; Lewis, B. (Roy. Postgrad. Med. Sch., London, England). *Lancet* (7767):62-64, 1972.

The mechanism and clinical features of alcoholic hypertriglyceridemia have been studied in 13 patients (11 men and 2 women, aged 29-59 yr) whose alcohol intake was at least 140 g/day. There were 7 cases of associated vascular disease: ischemic heart disease (3), peripheral vascular disease (2), and both ischemic heart disease and peripheral vascular disease (2). Presenting symptoms included abdominal pain (1); Dupuytren's contracture (1), and severe parotid enlargement which subsided when alcohol was discontinued (1). None of these patients had xanthomata. Only one had withdrawal symptoms, suggesting that alcohol dependence was rare in this series. One patient had diet-responsive diabetes mellitus and another a diabetic glucose-tolerance curve. No other cause of secondary hypertriglyceridemia was found, and none of the patients had a family history of premature vascular disease or xanthomata. Elevations of one or more serum "liver enzymes" (LDH, alkaline phosphatase, SGOT, and γ-glutamyl transpeptidase) were observed in 5 patients, and elevations in serum amylase activities were found in 2, including the patient who presented with abdominal pain. Fatty changes were present in 6 of 7 liver biopsies and an additional patient had hepatomegaly. When alcohol was withdrawn, plasma triglyceride concentrations fell rapidly from 746±180mg/100 ml to 184±17 mg/100 ml with most of the decrease occurring during the first week. Since no significant change occurred in clearance of exogenous triglyceride from plasma when alcohol was withdrawn, the decrease in plasma triglyceride levels is not likely to be caused by enhanced peripheral uptake of lipid. It is suggested that alcohol-induced hypersecretion of lipoprotein only causes hyperlipidemia in those heavy drinkers with a relatively limited capacity for removal of triglycerides from plasma, while those with rapid removal rates may be able to deal with excessive triglyceride secretion by the liver.

1758 A NEW ANTIGEN COMPLEX CO-OCCURRING WITH AUSTRALIA ANTIGEN.

(E.) Magnius, L. O.; Espmark, A. (Statens Bakteriol. Lab., Stockholm, Sweden). *Acta Pathol. Microbiol. Scand.* [*B*] 80:335-337, 1972.

In Australia (Au) antigen positive sera, a new antigen complex has been detected by immunodiffusion tests. These antigens, one of which tentatively is designated *e*, are distinct from the *a*, *d*, *y*, and *x* determinants of the Au-antigen complex according to the nomenclature of Le Bouvier. The *e*-antigen was found in 18 of 23 persistent carriers of Au-antigen from hemodialysis units, in 6 out of 23 Au-positive hepatitis cases, but in none of 17 Au-antigen carrying blood donors. However, in the latter group 13 carried antibodies against the new antigen complex, 5 of which were against the *e*-antigen. Persistent carriers of Au-antigen among dialysis patients are highly contagious. These patients carry *e*-antigen in high frequency. The possibility of an association between this antigen and contagiousness is suggested.

1759 VIRUS-LIKE PARTICLES IN AUSTRALIA ANTIGEN-ASSOCIATED HEPATITIS: AN IMMUNOELECTRON MICROSCOPIC STUDY OF HUMAN LIVER.

(E.) Huang, S. N.; Millman, I.; O'Connell, A.; Aronoff, A.; Gault, H.; Blum, B. S. (Dept. Pathol., McGill Univ., Montreal, Canada). *Am. J. Pathol.* 67(3): 453-470, 1972.

Liver biopsies of renal transplant patients who developed chronic progressive viral hepatitis associated with persistence of Australia antigenemia [Au(1)] while under immunosuppressive therapy were previously studied. Predominantly intranuclear 210-250Å spherical, virus-like particles were found in 12 of 13 biopsies examined by electron microscope. No such particles were found in biopsies from Australia antigen negative patients. To investigate the relationship of these virus-like particles to Australia antigen, 2 of the Au(1) hepatitis renal transplant patients were studied again 6-8 months later. Liver biopsy material was prepared for light microscopy, immunofluorescent microscopy, electron microscopy, and immunoelectron microscopy. The specificity of the anti-Au(1) serum used in this study was ascertained by immunodiffusion and immunoelectrophoresis, and by immunoelectron microscopic studies of the antigen-antibody complex prepared *in vitro* by mixing the ferritin-conjugated anti-Au (1) reagent with the purified Au(1) particles. Electron microscopy of biopsies from liver not treated with antibody showed that virus-like particles persisted in liver cells. Immunofluorescent microscopy of teased liver biopsy suspensions showed nuclear and some cytoplasmic fluorescence, indicating the cellular localization of Au(1). The immunoelectron microscopic preparations showed agglutination of the virus-like particles and the presence of antibody-coupled ferritin in the intranuclear and cytoplasmic particle agglutinates. No virus-like particles were seen in the biopsy from a control patient without Au(1) antigenemia, and results of the immunoelectron microscopic procedure were negative. Massive amounts of Au(1)-associated particles located in liver cell nuclei of individuals with chronic active hepatitis strengthen the hypothesis that Au(1) is an infectious agent and/or the antigenic determinant of a hepatitis virus.

1760 PLASMAPHERESIS WITH ALBUMIN AS MAIN SUBSTITUTE IN ACUTE HEPATIC COMA. *(E.)* Haapanen, E.; Tiula, E. (Univ. Central Hosp., Helsinki, Finland). *Scand. J. Gastroenterol.* 7(1):75-83, 1972.

Acute hepatic coma was treated in 7 patients with a single exchange transfusion followed by 2-8 plasmaphereses. The average volume of blood shed during each procedure was 5.5 liters or a total of 43 liters/patient. The main substitute for plasma removed during the plasmaphereses was albumin. Out of 7, 5 patients regained consciousness after 1, 3, 3, 4, and 6 plasmaphereses and 4 of them were cured. In the comparison group none of the 5 patients survived.

1761 SERUM VITAMIN B_{12} BINDING PROTEINS IN VIRAL HEPATITIS. *(E.)* Rachmilewitz, M.; Moshkowitz, B.; Rachmilewitz, B.; Grossowicz, N.; Gross, J. (Hadassah Med. Sch., Jerusalem, Israel). *Eur. J. Clin. Invest.* 2(4):239-242, 1972.

Sera from patients (18-25 yr old) with viral hepatitis (diagnosed by clinical and epidemiological data) were examined for serum vitamin B_{12} concentration, unsaturated B_{12}-binding capacity, total B_{12}-binding capacity of whole serum and of separate transcobalamin-I and transcobalamin-II fractions. The high serum B_{12} concentrations observed were associated with an increase in the B_{12}-binding of the transcobalamins. The B_{12} bound to transcobalamin-I was 2-3 times higher than normal. Excessive amounts of B_{12} were bound to transcobalamin-II, as much as 30 to 40 times the normal. The unsaturated B_{12}-binding capacity of hepatitis sera is usually very low. In addition to the B_{12} bound to transcobalamins, a considerable part of the elevated serum B_{12} in hepatitis was in a dialyzable form and not bound to either transcobalamin-I or transcobalamin-II. This dialyzable B_{12} is apparently bound to a small peptide (molecular weight less than 10,000) which permits its passage through dialysis membrane but makes the B_{12} molecule unavailable to the microorganism in the bioassay, unless it is released from the peptide complex by boiling. Patients with cirrhosis of the liver at the state of active hepatitis, with higher serum B_{12} concentrations, had a similar pattern of changes of the B_{12}-binding proteins as acute hepatitis. The results obtained in acute hepatitis vary during the course of the disease.

1762 TISSUE LOCALIZATION OF AUSTRALIA ANTIGEN IMMUNE COMPLEXES IN ACUTE AND CHRONIC HEPATITIS AND LIVER CIRRHOSIS. *(E.)* Nowoslawski, A.; Krawczynski, K.; Brzosko, W. J.; Madalinski, K. (State Inst. Hyg., Warsaw, Poland). *Am. J. Pathol.* 68(1):31-55, 1972.

In 17 of 29 examined cases of fulminant hepatitis (4), subacute hepatitis (5), chronic aggressive hepatitis (7), liver cirrhosis (11), and chronic persistent hepatitis (2), Australia (hepatitis-associated) antigen (Au/HAA) was identified in the liver and/or in extrahepatic locations. The several immunofluorescent patterns of Au/HAA localization in hepatocytes suggests various stages of Au/HAA accumulation and release. Deposits of a mixture of immunoglobulins (Ig) G and M and occasionally β1C-globulin were found in the cytoplasm of Au/HAA-containing hepatocytes, on their plasma membranes, on or in the nuclei, in the cytoplasm of Kupffer cells and, rarely, in the sinusoids. The accompanying tissue changes were hepatocellular degeneration and necrosis. These intra- and extracellular complexes of Au/HAA and immunoglobulins displayed strong affinity for guinea pig complement in the immunohistochemical complement-fixation reaction. When tested by immunodiffusion in agar, IgG dissociated from these complexes by potassium thiocyanate (KSCN) treatment showed anti-Au/HAA specificity. In fulminant hepatitis neither Au/HAA nor immunoglobulins and complement were found in the liver. In chronic aggressive hepatitis and subacute hepatitis the amount of the Au/HAA immune complexes identified in the liver was almost inversely proportional to the extent and severity of the parenchymal lesions. In cirrhosis and chronic persistent hepatitis there was a positive correlation between the amount of the Au/HAA immune complexes found in the liver and the degree of hepatocellular damage. The deposits of Au/HAA, identified in extrahepatic locations including germinal centers of lymph nodes and spleen, kidney glomeruli, and blood vessel walls, were usually accompanied by deposits of IgG, IgM, β1C-globulin and fibrin. All these deposits showed strong affinity for guinea pig complement in the immunohistochemical reaction of complement-fixation. Germinal center activation, chronic membraneous glomerulonephritis, panarteritis, and simple arteriolar hyalinosis were found where these deposits were located.

1763 AUSTRALIA ANTIGEN IN LABORATORY CONTROL SERUM SOLUTIONS: AN UNNECESSARY HAZARD. *(E.)* Ginsberg, A. L.; Conrad, M. E. (Walter Reed Army Med. Ctr., Washington, D.C.). *N. Engl. J. Med.* 287(21):1097, 1972.

A warning is issued against unnecessary exposure of laboratory personnel to hepatitis B, resulting from commercial control serum solutions which are not screened for Australian antigen and inadequate cautioning in handling. Randomly selected lots of 10 commerically available serum pools were tested. None was positive by immunoelectroosmophoresis. However, 9 of the 10 were positive by radioimmune assay. These 10 pools were lyophilized and were to be reconstituted in distilled water. However, there is no evidence that lyopilization destroys infectively. Commercial lyophilized preparations can transmit viral hepatitis.

1764 PLASMAPHERESIS WITH PLASMA EXCHANGE IN HEPATIC COMA. II. FULMINANT VIRAL HEPATITIS AS A SYSTEMIC DISEASE. *(E.)* Lepore, M. J.; Stutman, L. J.; Bonanno, C. A.; Conklin, E. F.; Robilotti, Jr., J. G.; McKenna, P. J. (St. Vincent's Hosp., New York, N.Y.). *Arch. Intern. Med.* 129(6):900-907, 1972.

Nine patients with acute fulminant hepatic necrosis with stage 4 coma were subjected to plasmapheresis with plasma exchange. Two emerged from coma only to die from pulmonary complications. Despite improving hepatic function and regeneration of hepatocytes, all patients died of extrahepatic complications. Of the 9, 3 had Australia antigen (HAA) in the serum before plasmapheresis. Postmortem studies of one patient utilizing immunofluorescent tagging techniques, demonstrated HAA in all tissues studied, including liver, brain, heart, lung, ovary, spleen, and kidney. Fulminant viral hepatitis is a systemic disease with multiple organ involvement. Therapy should be directed not only to the liver but should include measures designed to combat systemic effects of the virus. Protein-bound factors may cause the coma and downhill course of these patients. Polyacrylamide gel electrophoresis revealed (in 4 of 5 patients) a bond in the β-globulin range present before plasmapheresis, disappearing after vigorous plasmapheresis, reappearing on termination or interruption of plasmapheresis, and remaining till death.

1765 ANICTERIC HEPATITIS PRESENTING AS POLYARTHRITIS. *(E.)* Stevens, D. P.; Walker, J.; Crum, E.; Roth, H. P.; Moskowitz, R. W. (Case Western Reserve Univ., Cleveland, Ohio). *JAMA* 220(5):687-689, 1972.

1766 DRUG ABUSE AND VIRAL HEPATITIS IN MARINES. *(E.)* Wenzel, R. P.; Le Bouvier, G. L.; Beam, Jr., W. E. (Nav. Med. Field Res. Lab., Camp Lejeune, N.C.). *JAMA* 220(5):707-709, 1972.

1767 CURRENT STATUS OF EXCHANGE TRANSFUSION IN FULMINANT HEPATITIS. *(E.)* Rivera, R. A. (George Washington Univ. Sch. Med., Washington, D.C.). *Med. Ann. D. C.* 41(5):277-280, 1972.

1768 AUSTRALIA ANTIGEN AND HEPATITIS IN THE WEST OF SCOTLAND: (SEPTEMBER 1970-SEPTEMBER 1971). *(E.)* Ross, C. A. C.; Pringle, R. C.; McMichael, S. (Ruchill Hosp., Glasgow, Scotland). *Health Bull. (Edinb.)* 30(2):120-122, 1972.

1769 SERUM CERULOPLASMIN IN VIRAL HEPATITIS. *(Pol.)* Kraj, M.; Ciesluk, S.; Wnorowska, B. (Inst. Hematol., Warsaw, Poland). *Pol. Arch. Med. Wewnet.* 48(4):389-395, 1972.

1770 FUNCTIONAL STATE OF THE PANCREAS IN PATIENTS WITH ACUTE AND CHRONIC INFECTIOUS HEPATITIS AND POSTHEPATIC CIRRHOSIS OF THE LIVER. *(Rus.)* Valenkevich, L. N.; Iakhontova, O. I. (Leningrad Pediatr. Med. Inst., USSR). *Sov. Med.* (6):82-86, 1972.

1771 TREATMENT OF HEPATIC COMA WITH EXCHANGE TRANSFUSIONS. *(Ger.)* Kettner, W.; Horning, I.; Strahnz, K.; Muller, D.; Oehme, G.; Fischer, G. (Reg. Hosp., Cottbus, Germany). *Z. Aerztl. Fortbild.* 65(18):963-966, 1971.

1772 HEPATITIS-ASSOCIATED ANTIGEN IN SPORADIC CASES OF ACUTE VIRAL HEPATITIS. *(E.)* Kelen, A. E.; Hathaway, A. E.; McLeod, D. A.; Nagler, F. P. (Canadian Communicable Dis. Ctr., Dept. of Natl. Health and Welfare, Ottawa, Ontario, Canada). *Can. Med. Assoc. J.* 106(1):32-35, 1972.

1773 IMMUNO-ELECTRON MICROSCOPY OF HEPATITIS B ANTIGEN IN LIVER. *(E.)* Gerber, M. A.; Schaffner, F.; Paronetto, F. (Mount Sinai Sch. Med., City Univ. New York, N.Y.). *Proc. Soc. Exp. Biol. Med.* 140(4):1334-1339, 1972.

1774 EVALUATION OF THE MANAGEMENT OF HEPATIC ENCEPHALOPATHY. *(E.)* Cohen, M. I.; Litt, I. F. (Albert Einstein Coll. Med., Bronx, N.Y.). *J. Pediatr.* 80(5):851-854, 1972.

1775 CURRENT PROBLEMS OF ANICTERIC HEPATITIS IN CHILDREN. *(Ger.)* Schneeweiss, B.; Beck, R.; Gudowski, G.; Tacke, A.; Wiegand, U.; Puschel, J.; Dieckhoff, J. (Charite Hosp., Berlin, Germany). *Dtsch. Gesundheitsw.* 27(6):270-275, 1972.

1776 SERUM HEPATITIS AFTER EXCHANGE TRANSFUSIONS. *(Ger.)* Scholz, H.; Dorffel, W.; Mitschke, I. (Berlin-Buch Munic. Clin., Germany). *Dtsch. Gesundheitsw.* 27(22):1024-1027, 1972.

1777 AUSTRALIA ANTIBODIES IN NORMAL SUBJECTS AND PATIENTS RECOVERING FROM SERUM HEPATITIS: A STUDY WITH THE RADIOIMMUNE PRECIPITATION TEST. *(Ger.)* Schober, A.; Thomssen, R. (Hyg. Inst., Univ. Gottingen, Germany). *Dtsch. Med. Wochenschr.* 97(24):939-942, 1972.

1778 BARBITURATE TOLERANCE IN PATIENTS WITH ACUTE HEPATITIS. *(Ger.)* Richter, E.; Zilly, W.; Brachtel, D.; Becker, S. (Med. Clin., Univ. Wurzburg, Germany). *Dtsch. Med. Wochenschr.* 97(7):254-255, 1972.

1779 NONPARENTERAL SERUM HEPATITIS: REPORT OF AN OUTBREAK. *(E.)* Garibaldi, R. A.; Hatch, F. E.; Bisno, A. L.; Hatch, M. H.; Gregg, M. B. (Univ. of Utah Med. Ctr., Salt Lake City). *JAMA* 220(7):963-966, 1972.

1780 RISK OF POSTTRANSFUSION HEPATITIS IN THE UNITED STATES: A PROSPECTIVE COOPERATIVE STUDY. *(E.)* Grady, G. F.; Bennett, A. J. E. (Tufts Univ. Sch. Med., Boston, Mass.). *JAMA* 220(5):692-701, 1972.

1781 VIRAL HEPATITIS WITH A NEUROLOGICAL ONSET. *(Fr.)* Paillet, R.; Giordano, C.; Exiga, J. (no affil.). *Med. Trop. (Mars.)* 32(3):285-289, 1972.

1782 SERUM LIPIDS IN INFECTIOUS HEPATITIS IN CHILDREN. *(Ger.)* Spahn, U.; Lehnert, U.; Plenert, W. (Pediatric Clin., Univ. Jena, Germany). *Monatsschr. Kinderheilkd.* 120(4):133-138, 1972.

1783 CURRENT CONCEPTS IN VIRAL HEPATITIS: DIAGNOSIS AND TREATMENT. *(E.)* Shaffer, R. D.; Pyron, K. A.; Winship, D. H. (Univ. Missouri, Med. Ctr., Columbia). *Mo. Med.* 69(6):432-437, 1972.

1784 COMPLEMENT LEVELS IN ACUTE INFECTIOUS HEPATITIS AND SERUM HEPATITIS. *(E.)* Kosmidis, J. C.; Leader-Williams, L. K. (East Birmingham Hosp., Birmingham, England). *Clin. Exp. Immunol.* 11(1):31-35, 1972.

1785 AUSTRALIA ANTIGEN AND HEPATITIS: A REVIEW. *(E.)* Cossart, Y. E. (Central Public Health Lab., London, England). *J. Clin. Pathol.* 24(5):394-403, 1971.

1786 VIRUS-LIKE PARTICLES IN THE LIVER AND THEIR RELATIONSHIP TO AUSTRALIA ANTIGEN. *(E.)* Deutsch, G. F.; Spence, L. (Dept. Microbiol. Immunol., McGill Univ., Montreal, Canada). *Lancet* (7747):447, 1972.

1787 BIOPHYSICAL AND BIOCHEMICAL HETEROGENEITY OF PURIFIED HEPATITIS B ANTIGEN. *(E.)* Dreesman, G. R.; Hollinger, F. B.; Suriano, J. R.; Fujioka, R. S.; Brunschwig, J. P.; Melnick, J. L. (Baylor Coll. Med., Houston, Tex.). *J. Virol.* 10 (3):469-476, 1972.

1788 RENAL MORPHOLOGICAL AND IMMUNOLOGICAL CHANGES ASSOCIATED WITH ACUTE VIRAL HEPATITIS. *(E.)* Eknoyan, G.; Gyorkey, F.; Dichoso, C.; Martinez-Maldonado, M.; Suki, W. N.; Gyorkey, P. (Baylor Coll. Med., Houston, Tex.). *Kidney Int.* 1 (6):413-419, 1972.

1789 ARTHRITIS ASSOCIATED WITH VIRAL HEPATITIS. *(Fr.)* Gueroult, N.; Dorfmann, H.; Etienne, J. P. (Broussais Hosp., Paris, France). *Ann. Med. Interne* 123(6/7):561-571, 1972.

1790 IMMUNE COMPLEXES IN VIRAL HEPATITIS. *(E.)* Kater, L.; Borst-Eilers, E.; van Gorp, L. H. M. (Univ. Hosp., Utrecht, Netherlands). *Lancet* (7747):447-448, 1972.

1791 VIRAL HEPATITIS DURING PREGNANCY. *(E.)* Kehayoglou, K. A.; Stavropoulos, A. K.; Lolis, D. E.; Kairis, N. M. (Univ. Athens, Sch. Med., Greece). *Int. J. Gynaecol. Obstet.* 10(3):102-107, 1972.

1792 ANTIBODY TO HEPATITIS-ASSOCIATED ANTIGEN. *(E.)* Lander, J. J.; Holland, P. V.; Alter, H. J.; Chanock, R. M.; Purcell, R. H. (Lab. Infec. Dis., Natl. Inst. Health, Bethesda, Md.). *JAMA* 220(8):1079-1082, 1972.

See also, 1120, 1211, 1212, 1262, 1282, 1285, 1795, 1799, 1803

LIVER AND BILIARY TRACT

Chronic Hepatitis

1793 THE OCCURRENCE AND SIGNIFICANCE OF ABNORMAL BILE DUCT EPITHELIUM IN CHRONIC AGGRESSIVE HEPATITIS. *(E.)* Christoffersen, P.; Dietrichson, O.; Faber, V.; Poulsen, H. (Kommunehosp., Copenhagen, Denmark). *Acta Pathol. Microbiol. Scand.* [A] 80(3): 294-302, 1972.

Primary biopsies exhibiting chronic aggressive hepatitis from 57 patients have been selected from 3000 consecutive liver biopsies. Cases suspected of cirrhosis or acute viral hepatitis with slight or moderate periportal changes in the form of piece-meal necroses have been excluded. The material is divided into two groups: (1) 21 patients (17 women, 4 men; average age 64 and 72 yr, resp.) with abnormal biliary epithelium and (2) 36 patients (23 women, 13 men; average age 54 and 29 yr, resp.) without abnormal biliary epithelium. No morphological or biochemical differences between the 2 groups have been demonstrated apart from the atypical epithelium. There was more frequently an insidious development of the disease in group 1. A significantly higher incidence of organ-nonspecific antinuclear factors occurred in group 1 than in group 2, whereas mitochondrial antibodies were found in serum from only 1 patient. None of the sera available from group 1 and from female patients in group 2 contained Australian antigen, but in most of the male patients from group 2 precipitating lines were observed. A morphological follow-up of slightly more than half the patients revealed a significantly more frequent development of cirrhosis in the group with abnormal biliary epithelium.

1794 IMMUNOSUPPRESSIVE TREATMENT OF CHRONIC AGGRESSIVE HEPATITIS AND PRIMARY BILIARY CIRRHOSIS. *(Ger.)* Lampe, K.; Hudepohl, M.; Schopen, R. D. (Munic. Hosp., Osnabruck, Germany). *Med. Klin.* 67(15):527-534, 1972.

Azathioprine therapy was given to 51 patients with chronic hepatitis. These included 26 (12 men and 14 women, aged 28-62 yr) with chronic aggressive hepatitis, 14 (8 men and 4 women, aged 48-67 yr) with posthepatitic cirrhosis, 7 (all men, aged 42-58 yr) with alcoholic cirrhosis, and 4 (1 man and 3 women, aged 37-52 yr) with biliary cirrhosis. Azathioprine was given in doses of 2-2.7 mg/kg/day for 9-16 days, depending upon the patient's tolerance. The dose was then reduced to 1.5-2 mg/kg/day and was individually adjusted on the basis of WBC, hemoglobin, and thrombocyte values determined at 3-day intervals. Prior treatment with prednisone (50 mg/day) was given to 38 patients with transaminase activities of more than 120 mU and bilirubin levels of more than 6 mg/100 ml on admission until these values returned to normal. The average follow-up period was 2 yr 1 month. As determined from liver function tests, results of therapy were good in 22 of 26 patients with chronic hepatitis, 12 of 14 patients with posthepatitic cirrhosis, and 3 of 4 patients with biliary cirrhosis, but immunosuppressive therapy proved ineffective in all 7 patients with alcoholic cirrhosis. Abrupt discontinuation of therapy resulted in severe recurrences in 3 patients. The only side effect observed was gastric intolerance which regressed spontaneously in 2 patients. Patients with posthepatitic cirrhosis appeared to be more susceptible to bone-marrow depression than patients in other groups, and their doses of azothioprine had to be carefully adjusted. No disturbances in gastrointestinal motility or absorption, hair loss, cholestasis, cystitis, or allergies were observed. It is recommended that patients be advised of the possible effect of azothioprine on the germ cells, and that women of child-bearing age be given contraceptives to prevent possible fetal damage. Immunosuppressants should only be used for life-threatening liver disease in younger patients.

1795 POLYARTERITIS NODOSA ASSOCIATED WITH CHRONIC HEPATITIS AND POSITIVE AUSTRALIA ANTIGEN. *(Ger.)* Martini, G. A.; Strohmeyer, G.; Sodomann, C. P. (Med. Clin., Univ. Marburg, Germany). *Dtsch. Med. Wochenschr.* 97(16):642-645, 1972.

Case reports are presented for 3 patients who developed polyarteritis nodosa after chronic hepatitis. All 3 were positive for Australia antigen in the Ouchterlony double diffusion test; in 2 of these patients Australia antigen was present until the patients died. All 3 patients had typical prodromal symptoms and only very mild jaundice during the acute phase of the hepatitis and, with one exception, little or no jaundice in the chronic phase. All these patients had manifest neurological symptoms and muscle or joint pains, very likely before development of polyarteritis nodosa. Corticosteroids had been administered 14 days, at the latest, after onset of acute hepatitis and before the polyarteritis nodosa had developed or at least before it had been diagnosed. Two of these patients were surgeons, one of whom contracted hepatitis after injuring himself while operating on a patient with acute yellow liver dystrophy. A colleague of this surgeon contracted hepatitis at the same time, has a positive test for Australia antigen, and has developed polyneuropathy characteristic of polyarteritis nodosa; the diagnosis has not been confirmed with a biopsy. Possible explanations for the association between polyarteritis nodosa and Australia-antigen-positive chronic hepatitis are: (1) that chronic hepatitis is a prerequisite for the development of polyarteritis nodosa because of the immune complex formed with Australia antigen; (2) that there is a constitutional predisposition to the production of circulating immune complexes; (3) that there is a special form of hepatitis which occurs in association with polyarteritis nodosa; or (4) that steroid therapy may be a factor precipitating polyarteritis nodosa.

1796 CELL-MEDIATED IMMUNE RESPONSES IN CHRONIC LIVER DISEASES. *(E.)* Smith, M. G. M.; Golding, P. L.; Eddleston, A. L. W. F.; Mitchell, C. G.; Kemp, A.; Williams, R. (King's Coll. Hosp. Med. Sch., London, England). *Br. Med. J.* (5799):527-530, 1972.

Studies of the cell-mediated response to liver antigens, using the leukocyte migration test, in 163 patients with various liver disorders revealed abnormal responses almost confined to active chronic hepatitis (53% abnormal), primary biliary cirrhosis (64%), and cryptogenic cirrhosis (29%). The test was also abnormal in 5 of 7 patients with drug hypersensitivity jaundice and in 1 patient with acute infectious hepatitis when serum mitochondrial antibodies were present. More active chronic hepatitis cases on prednisone or azathioprine had normal tests than those who went untreated. In 8 of 10 examined serially during therapy leukocyte migration also improved. Abnormal responses to salivary gland or kidney antigens were found in nearly half of those with features of Sjogren's syndrome or renal tubular acidosis as part of a multisystem involvement. Although this occurs in cryptogenic cirrhosis, it was found with greater frequency in active chronic hepatitis and primary biliary cirrhosis. These cell-mediated immune responses, perhaps triggered by the initial damage to the liver from viral or other agents, may be responsible both for the perpetuation of the liver disease and, due to common surface antigens, for damage to other organs.

1797 "LUPOID" HEPATITIS, A NONENTITY IN THE SPECTRUM OF CHRONIC ACTIVE LIVER DISEASE. *(E.)* Soloway, R. D.; Summerskill, W. H. J.; Baggenstoss, A. H.; Schoenfield, L. J. (Mayo Clinic, Rochester, Minn.). *Gastroenterology* 63(3):458-465, 1972.

Clinical, biochemical, immunochemical, and histologic features were studied in 88 consecutive patients with chronic active liver disease. All patients were studied, regardless of the result of the lupus erythematosus (LE) test. Initially the LE test was positive in 30 patients and negative in 58. LE-positive patients were characterized by disease of shorter duration before symptoms developed and more frequent hepatosplenomegaly; higher levels of serum bilirubin, γ-globulin, and immunoglobulin G: longer prothrombin time; and lower levels of serum albumin. The incidence of subacute hepatitis with bridging was greater in LE-positive patients. In contrast, the two groups could not be differentiated by sex, age, associated disease an "autoimmune" type, most systemic manifestations of liver disease, response to treatment, the presence of smooth muscle antibody, antinuclear antibody, or Australia antigen, or the degree of plasma cell infiltration on liver biopsy. The LE cell test became negative in 92% of those who responded to treatment, but in none who failed to respond. Discriminant analysis of numerous variables did not distinguish characteristic features associated with the LE test in most patients. Thus a positive LE test indicates more active and severe liver disease rather than a different entity with a specific cause or prognosis.

1798 SIGNIFICANCE OF SERUM COMPLEMENT LEVELS IN CHRONIC LIVER DISEASE. *(E.)* Finlayson, N.D.C.; Krohn, K.; Fauconnet, M.H.; Anderson, K.E. (Cornell Univ. Med. Coll., New York, N.Y.). *Gastroenterology* 63(4):653-659, 1972.

Total hemolytic complement, complement 3, and complement 4 levels have been measured in 110 patients with chronic liver diseases of known and unknown causes. These included 15 with persistent hepatitis, 23 with chronic active hepatitis, 30 with cryptogenic cirrhosis, 14 with primary biliary cirrhosis, 20 with alcohol-associated cirrhosis, and 8 with miscellaneous conditions. Low complement levels were found in patients with poor liver synthetic function, as evidenced by low serum albumin levels and prolonged prothrombin times. There was no relation between low complement levels and the activity of the disease, as evidenced by SGOT activity, the serum γ-globulin level, or the presence of the hepatitis B antigen or autoantibodies. In 11 cases of chronic idiopathic liver disease with normal or low total hemolytic complement, complement 3, and complement 4 levels, the levels of the 1q subcomponent of complement 1 (Clq) were all normal. Only three of 110 sera gave reactions in systems capable of detecting immune complexes or their equivalents.

1799 AUSTRALIA ANTIGEN IN ACUTE AND CHRONIC LIVER DISEASE. *(Sp.)* Bruguera, M.; Caballeria, J.; Maragall, S.; Teres, J.; Rodes, J. (Clin. Provincial Hosp., Barcelona, Spain). *An. Med. (Barcelona)* 58(1):29-39, 1972.

1800 QUANTITATIVE DETERMINATION OF ANTIGLOBULINS OF THE IgG, IgA, AND IgM CLASS IN SERA OF PATIENTS WITH RHEUMATOID ARTHRITIS OR CHRONIC LIVER DISEASE AND OF HEALTHY PERSONS. *(E.)* Vischer, T. L.; Banziger, A. E. (Beau Sejour Hosp., Geneva, Switzerland). *Rev. Eur. Étud. Clin. Biol.* 17:422-425, 1972.

1801 IMMUNOSUPPRESSIVE THERAPY FOR CHRONIC AGGRESSIVE HEPATITIS. *(Ger.)* Becker, K. (1st Med. Clin., Univ. Hamburg, Germany). *Monatsschr. Kinderheilkd.* 120(6):232-236, 1972.

1802 METABOLIC CHANGES IN ACTIVE CHRONIC HEPATITIS. *(E.)* Alberti, K. G. M. M.; Record, C. O.; Williamson, D. H.; Wright, R. (The Radcliffe Infirm., Oxford, England). *Clin. Sci.* 42(5):591-605, 1972.

1803 OCCURRENCE OF AUSTRALIA ANTIGEN IN CHRONIC HEPATITIS IN ITALY. *(E.)* Bianchi, P.; Bianchi Porro, C.; Coltorti, M.; Dardanoni, L.; Del Vecchio Blanco, C.; Fagiolo, U.; Farini, R.; Menozzi, I.; Naccarato, R.; Pagliaro, L.; Spano, C.; Verme, G. (Inst. Med. Patholo., Padua, Italy). *Gastroenterology* 63(3):482-485, 1972.

1804 LOCAL "SHWARTZMAN EQUIVALENT" REACTION IN ACTIVE CHRONIC HEPATITIS. *(E.)* Whelton, M. J. (Roy. Free Hosp., London, England). *Gut* 13: 43-46, 1972.

See also, 1737, 1762, 1770, 1774, 1828

Alcoholic Liver Disease

1805 ALCOHOLIC HEPATITIS. *(E.)* Jewell, L. D.; Medline, A.; Medline, N. M. (Toronto Western Hosp., Canada). *Can. Med. Assoc. J.* 105(7): 711-714, 717, 1971.

Clinical and pathological data from 4 cases of fatal non-cirrhotic alcoholic hepatitis are presented. The patients (2 men and 2 women) were relatively young (35, 40, 42 and 45 yr), but had a long history of excessive alcohol intake. The disease had an acute onset which progressed inexorably to death in hepatic and renal failure. At autopsy the livers were enlarged but non-cirrhotic. The histological criteria for the diagnosis of alcoholic hepatitis are: an intense polymorphonuclear leukocytic exudate both in portal tracts and throughout the parenchyma, Mallory bodies (alcoholic hyaline) in the cytoplasm, and fine panlobular fibrosis which may be more marked about tributaries of the hepatic vein and result in central hyaline sclerosis. This panlobular distribution is not commonly encountered except in alcoholic hepatitis. Fatty changes appear as large droplets within the hepatocytes and may proceed to fatty cyst formation. Bile duct proliferation and cholestasis are observed, but are of little diagnostic importance.

1806 ORIGIN OF ALCHOLIC HYALINE: AN ELECTRON MICROSCOPIC STUDY. *(E.)* Albukerk, J.; Duffy, J. L. (Southside Hosp., Bayshore, N.Y.). *Arch. Pathol.* 93(6):510-517, 1972.

Electron microscopy of liver biopsies of 20 alcoholics disclosed fibrillar masses corresponding to classic alcoholic hyaline in 16. Patients all had a history of chronic alcoholism, a recent episode of acute alcoholic intoxication, and admission lab tests indicating hepatic dysfunction. All had varying degrees of partal fibrosis or active nutritional cirrhosis, alcoholic hyaline, and other alcoholic hepatitis findings. The temporal evolution of this hyaline was studied by grouping each case according to its established alcohol-free period. Masses aged 11 days or less disclosed fibrils with distinct periodicity and a broad width range. Those older than 11 days revealed a narrower average width and indistinct ultrastructural details. Nonuniformity of the fibrils make unlikely an endoplasmic reticular origin but suggests de novo formation. They could arise from the polymerization of hepatoplasmic protein molecules fragmented and distorted during an episode of alcoholic hepatitis. The alterations observed in older alcoholic hyaline could result from gradual resorption. This resorptive evolution of the hyaline suggests that it does not play a causal role in the production of cirrhosis. The extent of alcoholic hyaline may indicate the severity of the acute hepatic injury modified by the presence of cirrhosis.

1807 THE PHARMACOLOGY AND CLINICAL PHARMACOLOGY OF ALCOHOL. *(Ger.)* Coper, H. (Psychiat. Neurol. Clin., Free Univ., Berlin, Germany). *Dtsc* *Med. J.* 23(8):514-517, 1972.

1808 PERCUTANEOUS LIVER BIOPSY IN CHRONIC ALCOHOLICS ADMITTED TO A PSYCHIATRIC HOSPITAL. *(Por.)* Goncalves, C. S.; Pereira, F. E. L.; Buaiz, V.; Zanotti, W. M.; Zanandrea, B.; Santos, U. M. (no affil.). *Arq. Gastroenterol.* 9(1):5-10, 1972.

1809 EXOCRINE PANCREATIC FUNCTION IN CHRONIC ALCOHOLISM. *(Ger.)* Filippini, L.; Loffler, A. (Med. Clin., Canton Hosp., Luzern, Switzerland). *Dtsch. Med. Wochenschr.* 97(15):596-600, 1972.

1810 PANCREATIC EXOCRINE FUNCTION AND D-XYLOSE TEST IN PATIENTS WITH CHRONIC ALCOHOLISM. *(E.)* Carlsson, C.; Dehlin, O. (Univ. Goteborg, Sweden). *Acta Med. Scand.* 191(5):477-480, 1972.

1811 THE TREATMENT OF AFRICAN ALCOHOLICS: A REVIEW OF THE FIRST 400 CASES SEEN AT KWASIMAMA CLINIC. *(E.)* Gumede, M. V. (Ohlange High Sch., Durban, Union South Africa). *S. Afr. Med. J.* 46(15):430-433, 1972.

1812 PROGRESS REPORT: TREATMENT OF ACUTE ALCOHOLIC HEPATITIS. *(E.)* Resnick, R. H.; Iber, F. L. (Lemual Shattuck Hosp., Jamaica Plains, Mass.). *Gut* 13:68-73, 1972.

1813 MORPHOLOGIC VARIANTS OF ALCOHOLIC HYALIN. *(E.)* Yokoo, H.; Minick, O. T.; Batti, F.; Kent, G. (Northwestern Univ. Med. Sch., Chicago, Ill.). *Am. J. Pathol.* 69(1):25-40, 1972.

1814 DOSE-EFFECT RELATION IN ALCOHOLIC LIVER DISEASE. *(Ger.)* Lelbach, W. K. (Med. Clin., Univ. Bonn, Germany). *Dtsch. Med. Wochenschr.* 97(38):1435-1436, 1972.

1815 A CONTROLLED TRIAL OF FRUCTOSE IN THE TREATMENT OF ACUTE ALCOHOLIC INTOXICATION. *(E.)* Brown, S. S.; Forrest, J. A. H.; Roscoe, P. (Med. Res. Council Clin. Res. Ctr., Middlesex, England). *Lancet* (7983):898-900, 1972.

1816 STUDIES ON THE FECAL EXCRETION OF LIPIDS AND BILE ACIDS IN PATIENTS WITH FATTY LIVER. *(Ger.)* Erb, W.; Krohl, R.; Wildgrube, J.; Schreiber, J. (Ctr. Int. Med., Johann Wolfgang Goethe Univ., Frankfurt/Main, Germany). *Z. Gastroenterol.* 10(4):265-272, 1972.

See also, 1051, 1060, 1069, 1665, 1757

Cirrhosis

1817 THE EFFECT OF PORTACAVAL ANASTOMOSIS ON ORAL CARBOHYDRATE TOLERANCE AND ON PLASMA INSULIN LEVELS. *(E.)* Holdsworth, C. D.; Nye, L.; King, E. (St. Bartholomew's Hosp., London, England). *Gut* 13:58-63, 1972.

To test whether resistance to endogenous insulin produces the impaired glucose tolerance in chronic hepatic dysfunction, plasma insulin levels were raised in 11 patients with portal hypertension both by fasting and after p.o. glucose or i.v. tolbutamide. Following portacaval anastomosis oral fructose tolerance was impaired. Oral glucose tolerance did not significantly change. Plasma insulin levels were unchanged either fasting or following p.o. glucose load or tolbutamide. Insulin response was higher after intensive pancreatic β-cell stimulation by a glucose, tolbutamide, and glucagon combination. Thus in hepatic dysfunction patients, little insulin is removed by the liver from portal blood unless the insulin secretory rate is unusually high.

1818 INTERPOSITION MESOCAVAL SHUNT FOR TREATMENT OF PORTAL HYPERTENSION. *(E.)* Drapanas, T. (Tulane Univ. Sch. Med., New Orleans, La.). *Ann. Surg.* 176(4):435-448, 1972.

A 3 1/2 year experience with interposition mesocaval shunt utilizing a wide knitted Dacron graft in 25 poor surgical risk patients is presented. The 22 surviving patients have no deterioration of the hepatic function. The 3 surviving patients of 4 in whom hepatic encephalopathy was encountered preoperatively are symptom-free without dietary restrictions. Variceal hemorrhage has not recurred. Angiographic evaluation of the shunt in 15 patients revealed complete shunt patency with the knitted Dacron readily incorporated by surrounding fibrous tissue. Further, synthetic grafts placed between the superior mesenteric vein and inferior vena cava for relief of portal hypertension are extremely effective in protecting against recurrent hemorrhage, are easily performed, and offer the potential for continued perfusion of the liver by an intact portal flow from the upper abdominal viscera. This operation is also recommended for the better risk patient.

1819 METABOLISM OF CHOLIC ACID-24-^{14}C IN PATIENTS WITH HEPATOBILIARY DISEASES. *(E.)* Alstrom, T.; Norman, A. (Danderyd's Hosp. Danderyd, Sweden). *Acta Med. Scand.* 191:521-528, 1972.

Cholic acid-24-^{14}C was injected i.v. into 5 patients with chronic liver disease (Laennec's cirrhosis, 4 or amyloidosis, 1) and 3 patients with acute liver failure of different etiology (massive hepatic necrosis of unknown etiology, carbon tetrachloride liver injury, infectious hepatitis). The rate of disappearance of isotope from the blood during the first 60 min was depressed in patients with icterus. An anicteric patient with amyloidosis showed greatly depressed removal rate. Only trace amounts of isotope were excreted in urine during the first hours following injection and only a small fraction of the cholic acid pool was eliminated by urinary excretion, since less than 13% of the administered isotope was excreted in urine during the four days following injection. Even a case of massive hepatic necrosis eliminated only 5% of the isotope during these first 4 days. Similar studies were performed in 2 patients with interrupted enterohepatic circulation of bile acids due to calculi in the choledochus. Bile was sampled through a T-tube inserted in the common bile duct. These patients had imparied liver function, as indicated by bilirubin concentration above 6.0 mg/100 ml. The injected isotope was rapidly excreted in bile and all isotope was recovered in bile within 24 hr in conjugated form. Chromatographic analysis of urinary labeled metabolites showed that 8 of the 10 patients mainly excreted labeled conjugated bile acids. In two of the patients, one with Laennec's cirrhosis and one with hepatic necrosis, a constant excretion of 30-40% of unconjugated labeled bile acids was observed.

1820 CIRRHOSIS OF THE LIVER ASSOCIATED WITH α_1-ANTITRYPSIN DEFICIENCY. *(E.)* Ishak, K. G.; Jenis, E. H.; Marshall, M. L.; Bolton, B. H.; Battistone, G. C. (Armed Forces Inst. Pathol., Washington, D.C.). *Arch. Pathol.* 94(5):445-455, 1972.

The clinical, laboratory, and light and electron microscopic findings of hepatic biopsy specimens of a 20-year-old white woman homozygous for α_1-antitrypsin deficiency are reported. The patient has a multilobular cirrhosis characterized by multiple cytoplasmic acidophilic bodies in hepatocytes at the periphery of pseudolobulas. The bodies are strongly periodic acid-Schiff (PAS) positive and resist diastase digestion. A PAS stain (particularly after diastase digestion for removal of glycogen) should be performed on every possible case of hepatic disease with α_1-antitrypsin deficiency. Ultrastructurally, the inclusions, composed of a central osmophilic core surrounded by an electronlucent halo, are situated within cisternae of endoplasmic reticulum. A greater than normal amount of copper, demonstrated cytochemically and quantitated by analysis of neutron activation, was found in peripheral pseudolobular hepatocytes, perhaps due to a functional impairment of these hepatocytes. This resulted in interference in the transport of copper into bile.

1821 EVALUATION OF THE HEMODYNAMICS OF PORTAL HYPERTENSION IN THE SELECTION OF PATIENTS FOR SHUNT SURGERY. *(E.)* McDermott, Jr., W. V. (Boston City Hosp., Mass.). *Ann. Surg.* 176(4):449-456, 1972.

Experimental and clinical data from 410 elective portacaval and splenorenal shunts conducted over 20-yr are presented relative to factors influencing post-shunt encephalopathy and hepatic failure. Post-shunt encephalopathy increases with each decade of life with an incidence ranging from less than 20% in patients under 20 to 40% in those over 70 yr old.

Maintenance of hepatic blood flow is vital to recovery following shunt operation. Measurement of the difference between free portal pressure and hepatic occluded pressure indicates prograde flow in the portal vein and predicts the likelihood of post-shunt encephalopathy. Incidence of encephalopathy is higher and severity greater in cases where the pressure drop is greater than 10 cm of saline. Technics of hemodynamic evaluation should be amplified and used to identify high risk patients and to select appropriate operative procedure for portal hypertension.

1822 EFFECTS OF INTRAVENOUS INFUSION OF DOPAMINE IN CIRRHOTICS. *(E.)* Espiritu, C. R.; Mendoza, J. P.; Yeh, B. K. (Mt. Sinai Hosp. Greater Miami, Miami Beach, Fla.). *Proc. Soc. Exp. Biol. Med.* 141(1):331-335, 1972.

A study was made of the effects of 24 hr i.v. infusion of a therapeutic dose of dopamine in 9 cirrhotic patients without azotemia and one patient with mildly elevated blood urea nitrogen. Of the 10 patients, 7 were male, 3 female ranging in age from 39-78 yr, mean age 55. Their cirrhosis was associated with hepatitis (3), chronic alcoholism (4) and uncertain etiologies (3). None had a history of renal disease. Dopamine (2 μg/kg/min) produced a statistically significant decrease in creatinine clearance and urine osmolarity, and an increase in urinary sodium excretion of boderline significance. These could be attributed to "shunting" of blood from the renal cortex to the medulla brought about by dopamine. This effect was reversible when the drug infusion was discontinued. The therapeutic value of dopamine in hepatorenal syndrome is therefore being questioned. Data indicate that dopamine has little or no beneficial effect on renal function in cirrhotics.

1823 DEVELOPMENT OF HEMOSIDEROSIS AFTER SIDE-TO-SIDE PORTACAVAL SHUNTING. *(E.)* Baker, J. A.; Cohen, M. (Memorial Hosp. Med. Ctr., Long Beach, Calif.). *Gastroenterology* 63(3):491-494, 1972.

1824 HISTOCHEMICAL DEMONSTRATION OF COPPER IN LIVERS OF INDIAN CHILDHOOD CIRRHOSIS. *(E.)* Agarwal, V. P.; Agarwal, S.; Agarwal, V. P.; Agarwal, S. (S.P. Med. Coll., Bikaner, India). *Indian Pediatr.* 9(3):147-148, 1972.

1825 HYPERTROPHIC OSTEOARTHROPATHY IN PORTAL CIRRHOSIS. *(E.)* Pande, R. S.; Shah, P. R.; Asher, M. J.; Patel, M. C. (Med. Coll., Baroda, India). *J. Assoc. Physicians India* 20(4):335-337, 1972.

1826 PRESENCE OF MODIFIED FIBROBLASTS IN CIRRHOTIC LIVERS IN MAN. *(E.)* Bhathal, P. S. (Dept. Pathol., Univ. Melbourne, Australia). *Pathology* 4(2):139-144, 1972.

1827 PORTACAVAL SHUNT WITH ARTERIALIZATION OF THE HEPATIC PORTION OF THE PORTAL VEIN. *(E.)* Adamsons, R. J.; Kinkhabwala, M.; Moskowitz, H.; Himmelfarb, E.; Minkowitz, S.; Lerner, B. (Downstate Med. Ctr., Brooklyn, N.Y.). *Surg. Gynecol. Obstet.* 135(4):529-535, 1972.

1828 CIRRHOSIS: MORPHOLOGIC DYNAMICS FOR THE NONMORPHOLOGIST. *(E.)* Appleman, H. D. (Univ. Michigan Med. Sch., Ann Arbor, Mich.). *Am. J. Dig. Dis.* 17(5):463-472, 1972.

1829 BETAINE ASPARTATE IN THE TREATMENT OF LIVER DISEASE. *(It.)* Cairella, M.; Volpari, B. (Inst. Systematic Med. Ther., Univ. Rome, Italy). *Clin. Ter.* 60(6):513-534, 1972.

1830 CIRRHOSIS OF THE LIVER- AN UNUSUAL CAUSE OF SEVERE HYPOXEMIA. *(E.)* Kaplan, A. I.; Laguarda, R. (Boston VA Hosp., Mass.). *Respiration* 29(2):180-190, 1972.

1831 BLIND STUDY OF FINE-NEEDLE ASPIRATION BIOPSY SMEARS IN PATIENTS WITH BIOPTICALLY NORMAL OR CIRRHOTIC LIVERS. *(E.)* Myren, J.; Johansen, S. (Ulleval Hosp., Oslo, Norway). *Scand. J. Gastroenterol.* 7(4):403-406, 1972.

1832 ELIMINATION OF CHLORAMPHENICOL AND THIAMPHENICOL IN SUBJECTS WITH CIRRHOSIS OF THE LIVER. *(E.)* Azzollini, F.; Gazzaniga, A.; Lodola, E.; Natangelo, R. (Med. Div. of the Ospedale Maggiore "S. Carlo Borromeo", Milan, Italy). *Int. J. Clin. Pharmacol.* 6(2):130-134, 1972.

1833 TO WHAT EXTENT IS PORTAL HYPERTENSION SURGERY AFFECTED BY THE PROGRESS MADE IN SPLANCHNIC PHYSIOPATHOLOGY AND HEPATIC BIOLOGY? *(E.)* Staudacher, V.; Bevilacqua, G. (Dept. Gen. Emergency Surg., Univ. Milan, Italy). *Int. Surg.* 57(6):488-490, 1972.

1834 ANTIBODIES AND INTRAVASCULAR CLOTTING IN LIVER CIRRHOSIS. *(E.)* Gans, H.; Matsumoto, K.; Mori, K. (Cornell Med. Coll., New York, N.Y.). *Lancet* (7761):1181-1182, 1972.

1835 SYSTEMIC SCLEROSIS (SCLERODERMA) WITH CHRONIC LIVER DISEASE. *(E.)* Lim, H. L.; Da Costa, J. L. (Outram Road Gen. Hosp., Singapore). *Singapore Med. J.* 13(1):51-53, 1972.

1836 LIVER CIRRHOSIS IN CHRONIC ARSENIC INTOXICATION IN GRAPEGROWERS. *(Ger.)* Luchtrath, H. (Pathol. Inst., Koblenz, Germany). *Dtsch. Med. Wochenschr.* 97(1):21-22, 1972.

1837 HEPATIC MANIFESTATIONS OF CYSTIC FIBROSIS. *(Ger.)* Exss, R.; Mende, S. (Pediatric Clin., Univ. Bonn, Germany). *Dtsch. Med. Wochenschr.* 97(11): 425-428, 1972.

1838 TREATMENT OF BLEEDING FROM ESOPHAGEAL VARICES WITH THE LINTON-NACHLAS TUBE. *(Ger.)* Brunswig, D.; Liehr, H. (Med. Clin., Univ. Wurzburg, Germany). *Dtsch. Med. Wochenschr.* 97(13): 502-507, 1972.

1839 CYANOSIS AND CLUBBING OF THE FINGERS AND TOES IN CONGENITAL BILIARY ATRESIA. *(E.)* Kobayashi, A.; Ohbe, Y. (Natl. Children's Hosp., Tokyo, Japan). *Helv. Paediatr. Acta* 27(2):203-209, 1972.

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1842 TREATMENT OF DECOMPENSATION DUE TO ASCITES AND EDEMA IN CIRRHOTICS WITH MODURETIC. *(Fr.)* Imler, M.; Schlienger, J.-L.; Stahl, J. (Univ. Hosp. Ctr., Strasbourg, France). *J. Med. Strasbourg* 3(4):297-310, 1972.

1843 ARTERIALIZATION OF THE LIVER IN THE TREATMENT OF PORTAL HYPERTENSION. *(Ger.)* Zwirner, R.; Kern, E. (Surg. Clin., Univ. Wurzburg, Germany). *Fortschr. Med.* 90(13):506-507, 1972.

1844 SEDIMENTATION ANALYSIS OF BLOOD PROTEINS WITH THE ULTRACENTRIFUGE IN LIVER CIRRHOSIS. *(Ger.)* Schneiderbaur, A.; Barousch, R. (Munic. Hosp., Wien-Lainz, Austria). *Wien. Med. Wochenschr.* 122(12/13):178-182, 1972.

See also, 1061, 1228, 1677, 1774, 1940

LIVER AND BILIARY TRACT

Gallbladder and Biliary Tract Diseases

1845 ALTERATIONS IN HEPATIC BILE COMPOSITION AFTER CHOLECYSTECTOMY. *(E.)* Simmons, F.; Ross, A. P. F.; Douchier, I. A. D. (Roy. Free Hosp., London, England). *Gastroenterology* 63(3): 466-471, 1972.

Hepatic bile biochemistry has been studied by aspirating the common bile duct at the time of cholecystectomy in 23 patients with cholesterol gallstones and by duodenal aspiration in 17 patients 3 or more months after cholecystectomy, and in 10 control subjects without gallbladder disease. Bile was studied both at the time of cholecystectomy and again 3-6 months after surgery in 10 of the cholesterol gallstone patients. Results confirm that hepatic bile from cholesterol gallstone patients contains excess cholesterol relative to bile salts and phospholipids. Calculating the bile salts + phospholipid-cholesterol and phospholipid-cholesterol ratios, and plotting the data on triangular coordinates indicates that after gallbladder removal, the hepatic bile was better able to maintain cholesterol in solution. The biochemical abnormality reported in hepatic bile was better able to maintain cholesterol in solution. The biochemical abnormality reported in hepatic bile of patients with cholesterol gallstones may not necessarily be continuous. In some patients the lipid composition of the bile may revert to a more normal pattern following cholecystectomy.

1846 MANAGEMENT OF CHOLEDOCHOLITHIASIS. *(E.)* Way, L. W.; Admirand, W. H.; Dunphy, J. E. (Univ. California Sch. Med., San Francisco). *Ann. Surg.* 176(3):347-359, 1972.

An analysis was made of the records of 200 patients who had choledochotomies to diagnose choledocholithiasis between 1960 and 1969 to determine the reliability of criteria used to decide on treatemnt. Common duct exploration revealed stones in 70% of all patients and in 65% of those who had cholecystectomies and choledochotomies, Of 952 patients having cholecystectomies 21% were explored and stones found in 14.4%. The use of operative cholangiography accounts for the high number of positive explorations. A palpable stone was found in almost half the positive explorations and was the most reliable indicator. Jaundice was reliable if the value was above 7.0 mg/100 ml or if it accompanied an attack of cholangitis. Mild jaundice by itself, small stones, or a dilated duct are unreliable indicators. Use operative cholangiography to establish the presence of stones in these circumstances. Postoperative cholangiography located residual stones in 7% of the patients. Residual stones are treated by chemical dissolution or mechanical extraction with a success rate greater than 50%.

1847 PAPILLOMA GALLBLADDER PRESENTING AS ACUTE ABDOMEN. *(E.)* Mohandas, D.; Saratchandra, R.; Bhaskar, A. G.; Paul, S. (Kilpauk Med. Coll., Madras, India). *Am. J. Proctol.* 23(3): 214-217, 1972.

1848 BILE COMPOSITION, BILE SALT METABOLISM AND GALLSTONES. *(E.)* Redinger, R. N.; Small, D. M. (Univ. Hosp., London, Canada). *Arch. Intern. Med.* 130(4):618-630, 1972.

1849 GALLSTONES AND FLATULENT DYSPEPSIA: CAUSE OR COINCIDENCE? *(E.)* Johnson, A. G.; (Fulham Hosp., London, England). *Postgrad. Med. J.* 47(554):767-772, 1971.

1850 CHOLECYSTITIS: A REVIEW OF 327 CASES. *(E.)* Kutty, M. K.; Balasegaram, M. (Inst. Med. Res., Edinburgh, Scotland). *J. Roy. Coll. Surg. Edinb.* 17(2):93-97, 1972.

1851 A CASE OF PROLAPSE OF THE COMMON BILE DUCT INTO A DUODENAL DIVERTICULUM. *(Rus.)* Arzhanov, S. Ia.; Kochubei, V. G. (Irkutsk Med. Inst., USSR). *Vestn. Rentgenol. Radiol.* (3):92-93, 1972.

1852 FOUR CASES OF ENTEROBILIARY FISTULAS. *(Fr.)* Soule, J. C.; Cocheton, J. J.; Christoforov, B.; Schaeffer, A.; Guerre, J.; Pequignot, H. (Cochin Hosp., Paris, France). *Sem. Hop. Paris* 47(40/41):2353-2362, 1971.

1853 THE BODY WEIGHT OF CHOLELITHIASIS PATIENTS AT SURGERY. *(Ger.)* Schmauss, A. K.; Werner, U.; Werner, H. (Munic. Hosp., Friedrichshain, Berlin, Germany). *Dtsch. Gesundheitsw.* 27(32):1521-1524, 1972.

1854 BILE SALTS: PHYSICAL PROPERTIES. *(E.)* Dowling, R. H. (Roy. Postgrad. Med. Sch., London, England). *Br. J. Hosp. Med.* 7(4):477-480, 1972.

1855 SEPTATE GALLBLADDER ASSOCIATED WITH DUODENAL BANDS IN CHILDREN. *(E.)* Isdale, J. (Johannesburg Hosp., Union South Africa). *S. Afr. Med. J.* 46(15):437-439, 1972.

1856 THREE-DIMENSIONAL RECONSTRUCTION OF INTRAHEPATIC BILE DUCTS IN A CASE OF POLYCYSTIC DISEASE OF THE LIVER IN AN INFANT. *(E.)* Jorgensen, M. (Univ. Inst. Pathol. Anat., Copenhagen, Denmark). *Acta Pathol. Microbiol. Scand.* [A] 80:201-206, 1972.

1857 CARCINOMA OF THE GALLBLADDER IN CALIFORNIA: 1955-1969. *(E.)* Krain, L. S. (UCLA Med. Ctr., Los Angeles, Calif.). *J. Chronic Dis.* 25(2): 65-71, 1972.

1858 A RARE ANOMALY OF THE EXTRAHEPATIC BILE DUCTS. *(Ger.)* Kulisek, V. (Surg. Clin., Brno-Zluty Kopec, Czechoslovakia). *Zentralbl. Chir.* 97(32):1137-1138, 1972.

1859 THE OCCURRENCE AND TREATMENT OF GALLBLADDER DISEASE IN ONTARIO. *(E.)* Milner, J.; Hewitt, D. (Sch. Hyg., Univ. Toronto, Canada). *J. Chronic Dis.* 25(2):73-83, 1972.

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1862 PAPILLOSTOMY AS THE TREATMENT OF COMMON BILE DUCT LITHIASIS. *(E.)* Stefanini, P. (2nd Surg. Clin., Univ. Rose, Italy). *Int. Surg.* 57(5):411-412, 1972.

1863 GALLSTONE ILEUS. *(E.)* Choudhury, A. (N.R.S. Med. Coll., Calcutta, India). *J. Indian Med. Assoc.* 56(12):377-384, 1971.

1864 OUTCOME OF CHOLECYSTOSTOMY. *(E.)* Welch, J. P.; Malt, R. A. (Massachusetts Gen. Hosp., Boston). *Surg. Gynecol. Obstet.* 135(5):717-720, 1972.

1865 TREATMENT OF GALLBLADDER RUPTURE IN AN INFANT. *(E.)* Songsanand, P.; Groff, D. B. (Catholic Med. Ctr., Jamaica, N.Y.). *Am. Surg.* 38(6):335-337, 1972.

1866 AN IMMUNOFLUORESCENT STUDY OF THE DISTRIBUTION OF IMMUNOGLOBULIN-CONTAINING CELLS IN THE NORMAL AND THE INFLAMED HUMAN GALLBLADDER. *(E.)* Green, F. H. Y.; Fox, H. (Dept. Pathol., Univ. Manchester, England). *Gut* 13(5): 379-384, 1972.

1867 FACTORS AFFECTING SURVIVAL OF PATIENTS WITH GALLBLADDER NEOPLASMS. *(E.)* Hart, J.; Modan, B. (Tel Hashomer Government Hosp., Israel). *Arch. Intern. Med.* 129(6):931-934, 1972.

1868 ACUTE CHOLECYSTITIS IN PREGNANCY AND THE PUERPERIUM. *(E.)* Friley, M. D.; Douglas, G. (Louisiana State Univ. Sch. Med., New Orleans). *Am. Surg.* 38(6):314-317, 1972.

1869 VAGOTOMY AND FUNCTION OF THE GALL-BLADDER. *(E.)* Kramhoft, J.; Balslev, I.; Lindahl, F.; Backer, O. G. (Frederiksberg Hosp., Copenhagen, Denmark). *Scand. J. Gastroenterol.* 7(2):109-112, 1972.

1870 POSTOPERATIVE HEMOBILIA. *(E.)* Vos, A. (Wilhelmina Gasthuis, Amsterdam, Netherlands). *Scand. J. Gastroenterol.* 7(3):193-195, 1972.

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1872 MODERN METHOD FOR TREATING DISEASES OF THE DESCENDING BILIARY TRACT. *(Ger.)* Dierel, H. (Barmherzigen Bruder Hosp., Salzburg, Austria). *Wien. Med. Wochenschr.* 122(14):187-190, 1972.

1873 EXTRAHEPATIC BILIARY TRACT ATRESIA AND CYTOMEGALIC INCLUSION DISEASE: CAUSAL RELATION OR COINCIDENCE? *(Ger.)* Pichler, E.; Schon, R. (Pediatr. Clin., Univ. Vienna, Austria). *Z. Kinderheilkd.* 112(4):261-264, 1972.

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1875 PROLONGED PALLIATION IN CARCINOMA OF THE MAIN HEPATIC DUCT JUNCTION. *(E.)* Terblanche, J.; Saunders, S. J.; Louw, J. H. (Groote Schuur Hosp., Cape Town, Union S. Africa). *Surgery* 71(5):720-731, 1972.

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1877 ACUTE ACALCULOUS CHOLECYSTITIS. *(E.)* Howard, R. J.; Delaney, J. P. (Univ. Minnesota Hosp., Minneapolis). *Minn. Med.* 55(6):549-551, 1972.

1878 IATROGENIC HEPATIC DUCT RUPTURE. *(E.)* Goldstein, W. B. (Danbury Hosp. Conn.). *Am. J. Roentgenol. Radium Ther. Nucl. Med.* 116(2):342-344, 1972.

1879 CARCINOMA OF THE GALLBLADDER: DIAGNOSIS AND EVALUATION OF REGIONAL SPREAD BY ANGIOGRAPHY. *(E.)* Sprayregen, S.; Messinger, N. H. (Montefiore Hosp., Bronx, N.Y.). *Am. J. Roentgenol. Radium Ther. Nucl. Med.* 116(2):382-392, 1972.

1880 METASTATIC MELANOMA OF THE GALLBLADDER. *(E.)* Shimkin, P. M.; Soloway, M. S.; Jaffe, E. (Natl. Cancer Inst., Bethesda, Md.). *Am. J. Roentgenol. Radium Ther. Nucl. Med.* 116(2):393-395, 1972.

1881 CHOLECYSTOPYLORIC FISTULA WITH GASTRIC OUTLET OBSTRUCTION: A RARE FORM OF GALLSTONE ILEUS AND ITS MANAGEMENT. *(E.)* Redding, M. E.; Anagnostopoulos, C. E.; Wright, H. K. (Univ. Chicago Hosp., Ill.). *Ann. Surg.* 176(2):210-212, 1972.

1882 ANHYDROUS CHOLESTEROL: A NEW CRYSTALLINE FORM IN GALLSTONES. *(E.)* Sutor, D. J.; Gaston, P. J. (Dept. Chem., Univ. Coll., London, England). *Gut* 13:64-65, 1972.

See also, 1077, 1193, 1208, 1220, 1222, 1223, 1235, 1242, 1250, 1266, 1268, 1464, 1572, 1640, 1676, 1819, 1839, 1841

GENERAL

1883 ISOLATION AND NATURE OF URINARY GASTROSECRETAGOGUE SUBSTANCES IN ZOLLINGER-ELLISON SYNDROME AND IN PERNICIOUS ANAEMIA. *(E.)* Vatier, J.; Neuburger, Ph.; Dubrasquet, M.; Bonfils, S. (Hosp. Bichat., Paris, France). *Clin. Chim. Acta* 40(2):391-398, 1972.

Isolation of urinary gastrosecretagogue factors was undertaken in 2 patients, 1 suffering from Zollinger-Ellison syndrome and the other from pernicious anemia. The peptides were extracted by salt precipitation. Isolation and purification of gastrosecretagogue metabolites was achieved by chromatography on Sephadex and aminoethylcellulose. Analysis of the elemental amino acids was carried out on each biologically active fraction. In pernicious anemia these metabolites bear a direct relation to antral hormone, while in the Zollinger-Ellison syndrome there are 2 types of gastrosecretagogues. Together with a gastrin metabolite there is a gastrosecretagogue peptide which appears to have no direct link with gastrin. This peptide may be specific to the tumour, as a pathological product secreted together with gastrin, or it may be a product of normal pancreatic secretion and merely become evident during tumor formation.

1884 SELECTIVE VASOCONSTRICTOR INFUSION IN THE MANAGEMENT OF ARTERIO-CAPILLARY GASTROINTESTINAL HEMORRHAGE. *(E.)* Rosch, J.; Dotter, C. T.; Antonovic, R. (Univ. Oregon Med. Sch., Portland). *Am. J. Roentgenol. Radium Ther. Nucl. Med.* 116(2):279-288, 1972.

Selective arterial infusion of epinephrene or vasopressin was used to treat 38 patients with active, arteriocapillary gastrointestinal bleeding. Vasoconstrictive therapy was 80% successful in small vessel bleeding, achieving complete control in 20; temporary control in 3; and no control in 2 of 25 patients with gastritis, superficial stress ulcers, the Mallory-Weiss syndrome, or colic lesions. Selective vasoconstriction in the management of large artery bleeding from peptic ulcers produced complete control in 2, temporary in 2, and no control in 9 of 13 patients. Individual factors of importance include: patient's general condition, supportive therapy, angiographic demonstration of the bleeding, character and location of the bleeding lesion, obtainable degree of infusion selectivity, choice of the vasoconstrictor, vascular response, and patient's clotting mechanism.

1885 ACID SECRETION AND SERUM GASTRIN LEVELS IN THE ZOLLINGER-ELLISON SYNDROME. *(E.)* Sanchez, R. E.; Longmire, Jr., W. P.; Passaro, Jr., E. (VA Ctr., Los Angeles, Calif.). *Calif. Med.* 116(6):1-7, 1972.

Thirteen cases of Zollinger-Ellison syndrome were reviewed. Of the 13 cases, 7 were Caucasian (6 male, 1 female, aged 36-65 yr) and 6 were Negro males, 14-53 yr. In 2 cases diagnosis was made by incidental biopsy of small liver nodules at operation for peptic ulcer. One of these 2 had a mistaken diagnosis of papillary carcinoma of the liver. Seven patients had gastric secretory tests which showed a basal acid output (BAO) to maximum acid output (MAO) ratio of more than 65%. Five patients had BAO:MAO ratios less than 50%, and 2 of these 5 had metastatic disease. A 30-month interval between incidental discovery of tumor and clinically evident disease was observed in 2 patients. Recurrence of symptoms after excision of tumor was noted after a similar interval in a third case. Two patients had multiple adenomata and hyperparathyriodism. Serum gastrin levels, before total gastrectomy, were elevated in all cases. The lowest preoperative level was 550 pg/ml (normal 100 to 150 pg/ml). They were diagnostic in 2 patients with normal gastric secretory studies. The levels fell to normal following total gastrectomy in 6 patients. Two patients still had elevated levels 5 and 14 years, resp. after total gastrectomy. One had a parathyroid adenoma with hypercalcemia. Total gastrectomy was curative in all the patients with the Zollinger-Ellison syndrome; lesser operations were not. As long as acid-producing parietal cells and gastrin-producing tumor cells are present, the disease continues.

886 CARCINOEMBRYONIC ANTIGEN (CEA) IN PATIENTS WITH CARCINOMA OF THE DIGESTIVE TRACT. *E.)* Holyoke, D.; Reynoso, G.; Chu, T. M. (Roswell Park Mem. Inst., Buffalo, N.Y.). *Ann. Surg.* 176(4): 559-564, 1972.

Plasma Carcinoembryonic Antigen (CEA) levels were studied in 113 patients to detect a possible relation to gastrointestinal malignancy. Follow-up information is available in 12 patients. Tumor removal in 8 patients lowered the CEA value to normal (less than 2.5 ng/ml of plasma in each). In two of these it rose again before recurrence was clinically detectable. In non-complete tumor removal (4 patients) the CEA values did not normalize. In one of these 4, chemotherapy normalized the CEA: a rise was noted before relapse was clinically detectable. Thus CEA screening for abdominal malignancy is of value in selected clinical problems. Application in diverse clinical settings may confirm its ultimate value as a screening test, prognostic marker, and disease monitor.

1887 NET AND UNIDIRECTIONAL TRANSMUCOSAL FLUX OF SODIUM AND WATER IN ACUTE HUMAN DIARRHEAL DISEASE. *(E.)* Banwell, J. G.; Shepherd, R.; Thomas, J.; Pierce, N. F.; Mitra, R. C.; Gorbach, S. L.; Brigham, K. L.; Fedson, D. S.; Mondal, A. (Johns Hopkins Hosp., Baltimore, Md.). *J. Lab. Clin. Med.* 80(5):686-697, 1972.

Nine Indian patients with bacteriologically-proven cholera diarrhea, 3 with diarrhea attributable to an enteropathogenic strain of *Escherichia coli*, and 6 Indian male control subjects were studied by means of the triple lumen tube perfusion techique. Subjects ranged in age from 20-60 yr (mean age 34 yr.). Net (J_{net}) and unidirectional [mucosa to serosa (Jm → s) and serosa to mucosa (Js → m)] flux rates were measured utilizing ^{24}Na and ^{3}HOH in jejunum and ileum in the acute and convalescent phase of the disease. All patients with cholera and *E. coli* diarrhea demonstrated net fluid secretion into the bowel lumen while control subjects demonstrated net fluid absorption. In all acute diarrheal disease both Js → m and Jm → s flux for sodium and water were increased but the greater increase in Js → s primarily accounted for the change from a normal net absorptive state to net secretion of sodium and water into the intestinal lumen. Unidirectional fluxes of ^{24}Na and ^{3}HOH were increased 3-5 fold over convalescent and control levels. An increase in $J_{s \rightarrow m}^{H_2O}$ in the jejunum was correlated with net jejunal fluid secretion, fasting intestinal (jejunal) flow rates, and stool output in acute cholera diarrhea.

1888 LYMPHOMAS OF THE GASTRO-INTESTINAL TRACT. *(E.)* Deodhar, L. P.; Purandare, S. M. (Dept. Pathol., Seth G. S. Med. Coll., Bombay, India). *J. Postgrad. Med.* 18(2):95-98, 1972.

1889 GASTROENTERITIS IN INFANTS: A RETROSPECTIVE STUDY. *(E.)* Dhanasekar, D. J.; David, J.; Koilpillai, H. (C.S.I. Hosp., Bangalore, India). *J. Christian Med. Assoc. India* 47(3):95-100, 1972.

1890 GASTRIC MUCINS IN FOUR CASES OF ZOLLINGER-ELLISON SYNDROME. *(E.)* Lehy, T. Dufougeray, F.; Neuburger, P. (Bichat Hosp., Paris, France). *Am. J. Dig. Dis.* 17(9):767-779, 1972.

1891 DIGITALIS AND THE MESENTERIC CIRCULATION. *(E.)* Shanbour, L. L.; Jacobson, E. D. (Univ. Texas Med. Sch., Houston, Tex.). *Am. J. Dig. Dis.* 17(9):826-828, 1972.

1892 FAILURE OF A SECRETIN FEEDBACK LOOP IN THE ZOLLINGER-ELLISON SYNDROME? THE "GASTRIC FACTOR" REVISITED. *(E.)* Bradley, III, E. L.; Galambos, J. T. (Woodruff Med. Ctr. Emory Univ., Atlanta, Ga.). *Am. J. Dig. Dis.* 17(10):939-944, 1972.

1893 SEASONAL GASTROENTERITIS AND MALABSORPTION AT AN AMERICAN MILITARY BASE IN THE PHILIPPINES. III. MICROBIOLOGIC INVESTIGATIONS AND VOLUNTEER EXPERIMENTS. *(E.)* Dean, A. G.; Couch, R. B.; Jones, T. C.; Douglas, Jr., R. G. (Natl. Inst. Allergy Infectious Dis., Honolulu, Hawaii). *Am. J. Epidemiol.* 95(5):451-463, 1972. 451-463, 1972.

1894 HEREDITARY ANGIONEUROTIC EDEMA OF THE GASTROINTESTINAL TRACT. *(E.)* Pearson, K. D.; Buchignani, J. S.; Shimkin, P. M.; Frank, M. M. (Dept. Diagn. Radiol., Natl. Inst. Health, Bethesda, Md.). *Am. J. Roentgenol.* 116(2):256-261, 1972.

1895 DIAGNOSIS OF GASTROINTESTINAL CANCER: CURRENT STATUS AND RECENT PROGRESS. *(E.)* Sherlock, P.; Ehrlich, A. N.; Winawer, S. J. (Memorial Hosp. Cancer Allied Dis., New York, N.Y.). *Gastroenterology* 63(4):672-700, 1972.

1896 RATIONALE FOR DIETS IN GASTROINTESTINAL DISEASE: A SYMPOSIUM: THE PANEL'S GOALS. *(E.)* Ingelfinger, F. J. (N. Engl. J. Med., Boston, Mass.). *J. Am. Diet. Assoc.* 60:473-474, 1972.

1897 INTESTINAL GAS PRODUCTION. *(E.)* Levitt, M. D. (Univ. Minnesota Hosp., Minneapolis, Minn.). *J. Am. Diet. Assoc.* 60:487-490, 1972.

1898 AMYLOIDOSIS IN MINK INDUCED BY REPEATED INJECTIONS OF ENDOTOXIN. *(E.)* Nordstoga, K. (Natl. Vet. Inst., Oslo, Norway). *Acta Pathol. Microbiol. Sand.* [A]. 80:159-168, 1972.

1899 HEREDITARY ANGIONEUROTIC EDEMA: A CASE WITH RECURRING ABDOMINAL PAIN. *(E.)* Kennedy, P. S.; Goyal, R. K.; Hersh, T. (Yale Univ. Sch. Med., New Haven, Conn.). *Am. J. Dig. Dis.* 17(5):435-438, 1972.

1900 PRIMARY HYPOMAGNESEMIA WITH SECONDARY HYPOCALCEMIA, DIARRHEA AND INSENSITIVITY TO PARATHYROID HORMONE. *(E.)* Woodard, J. C.; Webster, P. D.; Carr, A. A. (VA Hosp., Augusta, Ga.). *Am. J. Dig. Dis.* 17(7):612-618, 1972.

1901 SYSTEMIC LUPUS ERYTHEMATOSUS: A CAUSE OF "MEDICAL PERITONITIS". *(E.)* Musher, D. R. (New York Univ. Sch. Med., New York). *Am. J. Surg.* 124(3):368-372, 1972.

1902 FECAL LEUKOCYTES IN DIARRHEAL ILLNESS. *(E.)* Harris, J. C.; Dupont, H. L.; Hornick, R. B. (Univ. Maryland Sch. Med., Baltimore, Md.). *Ann. Intern. Med.* 75:697-703, 1972.

1903 DISEASE AND CHEMICAL SYNDROMES ASSOCIATED WITH SERUM LEVELS OF CREATINE PHOSPHOKINASE. *(E.)* Casey, A. E.; Gravlee, J. F.; Downey, E. L.; Copeland, H. (Memorial Inst. Pathol., Univ. Alabama, Birmingham). *Ala. J. Med. Sci.* 9(1):96-101, 1972.

1904 GASTROINTESTINAL MANIFESTATIONS OF PRIMARY AMYLOIDOSIS. *(E.)* Chernenkoff, R. M.; Costopoulos, L. B.; Bain, G. O. (Univ. Alberta Hosp., Edmonton, Canada). *Can. Med. Assoc. J.* 106(5):567-569, 1972.

1905 TUMOR-SPECIFIC ANTIGEN IN GI CANCER. *(E.)* Gold, P. (McGill Univ., Montreal, Canada). *Hosp. Prac.* 7(2):79-88, 1972.

1906 LOW MANNITOL CLEARANCE INTO CHOLERA STOOL AS EVIDENCE AGAINST FILTRATION AS THE SOURCE OF STOOL FLUID. *(E.)* Gordon, Jr., R. S.; Gardner, J. D.; Kinzie, J. L. (Natl. Inst. Arthritis Metabolic Dis., Bethesda, Md.). *Gastroenterology* 63(3):407-412, 1972.

1907 CYTOMEGALOVIRUS INCLUSION BODIES IN THE GASTROINTESTINAL TRACT. *(E.)* Henson, D. (Natl. Cancer Inst., Bethesda, Md.). *Arch. Pathol.* 93(6):477-482, 1972.

1908 CUTANEOUS PARANEOPLASIAS IN TUMORS OF THE GASTROINTESTINAL TRACT AND LARGE DIGESTIVE GLANDS. *(Ger.)* Herzberg, J. J. (St. Jurgen Street Central Hosp., Bremen, Germany). *Z. Gastroenterol.* 10(4):249-256, 1972.

1909 EPIDEMIOLOGY OF *ESCHERICHIA COLI* ENTERITIS. *(Ger.)* Koditz, H.; Linde, K.; Koch, H. (Pediatr. Clin., Univ. Jena, Germany). *Dtsch. Gesundheitsw.* 27(17):786-791, 1972.

1910 EVIDENCE FOR A SEX-LINKED DIFFERENCE IN ASPIRIN METABOLISM. *(E.)* Menguy, R.; Desbaillets, L.; Masters, Y. F.; Okabe, S. (Univ.

Rochester, Sch. Med., N.Y.). *Nature (Lond.)* 239(5367):102-103, 1972.

1911 FOOD ALLERGY IN CHRONIC DISEASES OF THE DIGESTIVE TRACT. *(E.)* Nogaller, A. M.; Gorbunov, J. V. (Med. Inst., Ryazan, USSR). *Acta llergol.* 27(2):145-158, 1972.

912 DIARRHEA: A CURRENT VIEW OF THE PATHO-PHYSIOLOGY. *(E.)* Phillips, S. F. (Mayo Clin., Rochester, Minn.). *Gastroenterology* 63(3): 495-518, 1972.

913 DIFFUSE LYMPHATIC HYPERPLASIA, LYMPHOMA, AND PSEUDOLYMPHOMA OF THE GASTROINTESTINAL TRACT. *(Ger.)* Rosch, W.; Fuchs, H. (Med. Clin., Univ. Erlangen-Nurnberg, Erlangen, Germany). *Dtsch. Med. Wochenschr.* 97(22):878-881, 1972.

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Immunoglobulin level in duodenal aspirates from 10 patients with chronic symptomatic giardiasis and 10 control subjects were examined 3 to 9 months after *Giardia lamblia* were eradicated with quinacrine and intestinal morphology and function were presumably fully recovered. Serum immunoglobulin concentrations in 10 symptomatic giardiasis patients were within normal range. In contrast, secretory immunoglobulin A of aspirates from the duodenojejunal junction was significantly lower (mean, 52.4 mg/100ml) than that obtained from the 10 control subjects under identical conditions (mean, 162.3mg/100ml). Results indicate the secretory immunoglobulin function can be dissociated from serum immunoglobulins, and decreased concentrations of secretory immunoglobulin A predisposed patients to colonization of intestinal mucous membranes by *G. lamblia.*

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The pathology, clinical features, and surgical problems of 34 cases of helminthoma selected on histological criteria were studied. Patients ranged in age from 2-72 yr, with the average age of 27.5 yr. There were 14 patients under the age of 16 yr. Of the 34 patients, 6 were Europeans and 28 Africans. Undamaged worms, isolated in 4 cases, were identified as *Oesophagostomum apiostomum* (3 cases) and *Ternidens deminutus* (1 case). Of these 34, 25 were solitary lesions with 16 of the 25 occurring in the ileocecal region. Multiple abscesses of ileum and colon occurred in 3 and anterior abdominal wall abscesses in 6. In a further review of 54 tuberculosis cases, 117 schistosomiasis cases, and 31 cases of amebiasis of the gastrointestinal tract and peritoneum, no cases of helminthoma were found. Helminthoma imitates carcinoma, appendicitis, appendicular abscess, diverticular disease, ileocecal tuberculosis, Crohn's disease, amebiasis and schistosomiasis. Unless the worm is found diagnosis is difficult. Eggs were never seen free in the tissues. Three evoluntionary stages of the inflammatory process were visible. Class I (8 cases) is the acute lesion with ill-defined sinuous abscess filled with fibrinous exudate where inflammatory cells may be scanty. Worms are likely to be found. In Class II (16 cases) the abscess or track is walled off by macrophage layers, epitheloid cells and fibroblasts. The worm has probably died and been reabsorbed. Class III (10 cases) is a chronic inflammatory mass suggestive of parasitic infestation, very pronounced eosinophilic infiltration, but no detectable worms, abscesses, or tracks.

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AGAARD. P.
1028. 1030
ARBAKKE. J.
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ARONSON. I.
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ARTS, E.M.
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AS. J.
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1746
BD-EL-SAMIE. Y.
1004
BDEL-AZIZ. M.T.
1724
BDEL KADER. M.M.
1724
BEL. J.H., JR.
1457
BIODUN. M.O.
1203
BRAHAM. S.
1112
CEVEDO GALLEGOS. F.
1242
DAMSONS. R.J.
1827
DELMAN. R.C.
1111
DLUNG, J.
1286
DMIRAND. W.H.
1676*. 1846*
DSON, M.A.
1221
GARWAL, S.
1824
GARWAL. V.K.
1347
GARWAL, V.P.
1824
GNEW. J.F.
1187*
GOSTI, A.
1431*
GOSTINI. L.
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GREN, G.
1661
GUNOD. M.
1191*
HO. A.J.
1448
HONEN. J.
1448
GNER. F.
1451
KAT. B.K.
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KAWA, T.
1137
AKURA. I.
1314
OVBIAN. V.A.
1161
AKSENOV, O.A.
1120
ALATULKKILA, M.
1498
ALBERTI. K.G.M.M.
1802
ALBUKERK. J.
1806*
ALESTIG. K.
1952
ALIMDZHANOV, KH.R.
1161
ALLEN, H.M.
1405
ALLGOWER, M.
1248*, 1413
ALLING, C.
1106
ALSTROM, T.
1819*
ALSTRUP, P.
985
ALTEMEIER, W.A.
1938
ALTER, H.J.
1282, 1792
ALVAREZ CALERO, A.
1237
AMBREESH.
1304
AMDRUP, E.
1386*, 1399, 1407
AMENT, M.E.
1499, 1508
AMER, M.S.
1011
ANACKER, H.
1196*
ANAGNOSTOPOULOS, C.E.
1881
ANCARANI, E.
1658
ANDERSEN, B.
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1924
ANDERSEN, J.B.
1421
ANDERSON, K.E.
1798*
ANDERSSON, H.
1631
ANDERSSON, S.
1000*, 1024
ANFALOVA, T.V.
1186
ANGEL, H.
1724
ANGHEL, E.
1512
ANTHONISEN, B.
1251
ANTHONY, P.P.
1950*
ANTONOVIC, R.
1884*
AOYAMA, Y.
1078
APAU, R.
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APODACA, J.
1211
APPLEMAN, H.D.
1828
ARAFA, A.
1724
ARAI, S.
1278
ARATEI, H.
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ARCHAMBAULT, L.
1708
ARHAN, P.
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ARIGA, K.
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ARIMORI, M.
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1711
ARKHIPOV, G.N.
1008, 1359
ARMANDO PARRA, C.
1594
ARNOLD, H.
1268
ARONOFF, A.
1759*
ARRATIA HERNANDEZ, J.
1714
ARREDONDO ZAMORA, A.
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ARRIGO, J.
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ARZHANOV, S.IA.
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ASAMIZU, J.
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1825
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ATKINS, A.M.
933
AUFSES, A.H., JR.
1696
AUKEE, S.
1391*, 1396, 1402, 1426
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BACHRACH, W.H.
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BAHADUR, V.
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BAIN, G.D.
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BAKER, J.A.
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BAKKE, D.M.
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BALAKRISHNA RAO, B.N.
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BALLON, S.
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BALOGH, K.
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BALSLEV, I.
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BALUN, M.
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BANK, S.
1441, 1650
BANKE, L.
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BANNASCH, P.
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BANWELL, J.G.
1887*
BANZIGER, A.E.
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BARAVALLE, M.
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BARAVALLE, N.
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BAREKAT, R.
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BARICHELLO, A.W.
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BARLEHNER, E.
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BAROIS, A.
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BARON, J.H.
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BAROUSCH, R.
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BARTELHEIMER, W.
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BARTELS, H.
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BARTLEY, J.C.
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BARWELL, N.J.
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BASKAKOV, V.A.
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BASSILY, S.
1953
BASTOS-DAVOLI, M.A.
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BATESON, E.M.
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BATTI, F.
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BATTISTONE, G.C.
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BAUCH, K.
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BAUER, H.
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BAUER, M.
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BAUGNET-MAHIEU, L.
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BAUME, P.E.
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BAUTISTA GALLO, A.
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BAX, N.
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BAYINDIR, S.
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BEAM, W.E., JR.
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BEATTIE, D.S.
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BEATTIE, E.J., JR.
1296, 1335
BEAUCHAMP, I.
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BEAUFINE-DUCROCQ, H.
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BECK, A.R.
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BELL, G.A.
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BELLAVIA, J.V.
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BENEDETTI, A.
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BENKE, G.
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BENNETT, A.J.E.
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BERG, G.
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BERG, P.A.
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BERGEN, W.G.
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BERGER, G.
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BERGUE, A.
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BERK, P.D.
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BERLIN, N.I.
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BERNSTEIN, J.
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BERNSTEIN, L.H.
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BERSTAD, A.
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BERTACCINI, G.
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BERTOLOTTI, R.
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BESOMBE, J.
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BETOURNE, C.
1750
BETRO, M.G.
1688
BETTARELLO, A.
1954
BEVAN, B.R.
1732
BEVILACQUA, G.
1833
BEZJAK, B.
1231
BHASKAR, A.G.
1847
BHATHAL, P.S.
1826
BIANCHI, L.
1753
BIANCHI, P.
1803
BIANCHI PORRO, C.
1803

ERNAT, J.
995*
LL, A.H.
1553
RD, F.H.
1050
RKENSTOCK, W.
1576
RSNER, J.W.
1247
SHOP, H.L.
1728*
SHOP, K.
1189*
SMUTH, H.
1190*
SNO, A.L.
1779
SSELL, D.M.
909*
TAR, K.
1157*
ZZI, A.
1134
ACK, O.
1043
ACK, O., JR.
1042
ACKLOW, N.R.
1926
AKER, F.
1620
ANCHARD, H.
1333
ANCO, A.
1168
ASCHKE, T.F.
1058*, 1725*
ATSAS, G.
1636
CH, P.
1104
CH, R.
964
CK, G.E.
1687
MBACK, M.
1279
MHOFF, J.P.
1737*
M, B.S.
1759*
M, E.
1454
KER, W.
1665
OUET, B.
1637
OCH, A.
1648
MER, R.
965
CESCU, L.
1638
LEAU, F.
1376
, B.
1190*

BOLANDE, R.P.
1516*
BOLDASOV, V.K.
1120
BOLTON, B.H.
1820
BOMBECK, C.T.
1128
BONANNO, C.A.
1764*
BONFILS, S.
1883*
BONGIOVANNI, A.M.
1507
BOOTH, C.C.
1484*
BORG, I.
1430
BORISIUK, I.I.
1604
BORST-EILERS, E.
1790
BOSSA, R.
1132
BOTTGER, G.
1325
BOUCHIER, I.A.D.
1187*, 1214, 1845*
BOUREL, M.
1694
BOUSQUET, R.
1565
BOWDEN, L.
1710
BRACHTEL, D.
1778
BRADA, Z.
928
BRADLEC, K.
1731
BRADLEY, E.L., III
1892
BRANDL, R.
1711
BRANDT, E.N.
999*
BRANDT, E.N., JR.
1003
BRANDT, K.H.
1733
BRANT, B.
1937
BRASFIELD, R.D.
1710
BREE, R.L.
1220
BREEN, K.
1051*
BRIEDIS, A.V.
1129
BRIGHAM, K.L.
1887*
BRIGHENTI, L.
1091
BRISTRIM, P.
960
BRITT, L.G.
1175

BRODERSEN, R.
1729
BROELL, J.R.
1469*
BROSTROM, C.O.
1135
BROUGH, A.J.
1682
BROUGH, B.J.
1009, 1019
BROWN, B.H.
1025
BROWN, C.H.
1519*
BROWN, I.E.
1570
BROWN, P.
1187*
BROWN, S.S.
1815
BRUCE, A.
1106
BRUGGER, A.M.
1302
BRUGUERA, M.
1799
BRUNA, J.
1338
BRUNSCHWIG, J.P.
1787
BRUNSON, J.G.
1052*
BRUNSWIG, D.
1838
BRUSH, B.E.
1597
BRYK, D.
1320, 1556
BRZOSKO, W.J.
1762*
BUAIZ, V.
1808
BUBLITZ, R.
1285
BUCHIGNANI, J.S.
1894
BUCKWALTER, J.A.
1578
BUGAJSKI, J.
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BUHLER, H.
1285
BUNCHMAN, H.H.
999*
BURKHART, K.L.
1280
BUSCH, H.
1704
BUSE, H.
1642
BUSS, H.
1273
BUSSOLATI, G.
1639
BUTLER, C.F.
961
BUTLER, D.G.
1916

BYNUM, T.F.
1037*
CABALLERIA, J.
1799
CACHIN, M.
1741
CADY, J.
1685
CADY, J.P.
1702
CAIRELLA, M.
1829
CALATRONI, A.
1418
CALLOWAY, D.H.
1936
CAMBELL, T.C.
1099
CAMERON, A.J.
1415
CAMPBELL, C.B.
1257
CAMPBELL, E.H.G.
997*, 998*, 1393*
CAMPBELL, J.S.
1587
CAMPBELL, J.W.
1055*
CANDIA CANDIA, E.
1249
CANIGIANI, G.
1334
CANTERBURY, J.M.
1029
CAPELLE, P.
1367, 1705
CAPPELLI, V.
969
CAPRILLI, R.
987
CARBALLO, L.
1237
CAREY, L.C.
1669
CARLSON, H.C.
1221, 1415
CARLSSON, C.
1810
CARR, A.A.
1900
CARRELLA, M.
1840
CARRERAS, M.
1657
CARTER, D.C.
1245
CARTER, J.M.
1416
CASALTA, V.
1249
CASCARANO, J.
927
CASE, R.M.
1033*
CASEY, A.E.
1903
CASS, A.S.
970
CASTELL, D.L.
979*
CASTELL, D.O.
991
CASTELLS, A.
1693
CASTLEMAN, B.
1618
CASTRUP, H.J.
931
CASU, A.
1209
CATCHPOLE, B.N.
1018
CAULIN, C.
1927
CEDERBAUM, A.I.
1069
CETTA, G.
1418
CEULEMANS, G.
1607
CHAIT, A.
1757*
CHAKRABORTY, P.
1935
CHAKRAVARTI, R.N.
1951*
CHALNOT, P.
1376
CHAMBERS, R.A.
1567
CHANDLER, A.M.
993
CHANOCK, R.M.
1792, 1926
CHASE, H.P.
1166
CHATTERJEE, A.
1722
CHATTERJEE, B.P.
1295
CHAUN, H.
1648
CHAVEZ, C.M.
1459
CHEETHAM, H.D.
1580
CHERNENKOFF, R.M.
1904
CHERNISH, S.M.
975*
CHERNOV, A.J.
1485*
CHEVALIER, M.M.
1079
CHHUTTANI, P.N.
1674*, 1951*
CHIBRIKIN, V.M.
1186
CHIO, L.F.
1246
CHIOCCA, J.C.
1315
CHIR, M.
1171*
CHIRIFE, A.M.
1675*
CHITIYO, M.
1308
CHOI, H.J.
1358
CHOPRA, P.K.
1722
CHOUDHRY, K.U.
1296, 1335
CHOUDHURY, A.
1561, 1863
CHRISTIANSEN, J.
1030
CHRISTIANSEN, P.
1399, 1407
CHRISTOFFERSEN, P.
1793*
CHRISTOFOROV, B.
1852
CHU, T.M.
1886*
CHUA, K.L.
1289
CHUADHARY, S.C.
929
CHUENKOV, V.F.
1428
CHUGH, K.S.
1674*
CHUNG, A.
911*
CHUNG, J.M.
1255, 1377
CHUNG, K.S.
1255, 1377
CHUTTANI, H.K.
1513
CHVAPIL, M.
928, 1114
CIESLUK, S.
1769
CINTI, D.L.
1146
CIUREA, M.
1303
CLARET, M.
971
CLARK, A.J.
942
CLARK, H.E.
1140
CLARKE, A.D.
1021
CLARKE, A.E.
1698
CLARKE, S.D.
1178
CLASSEN, M.
1256, 1341*
CLEMENCON, G.
1027
CLOT, J.P.
1685, 1702
COAN, M.H.
1046
COCHETON, J.J.
1852
COCKS, J.R.
1388*

CODE, C.F.
949*
COHEN, H.
1664
COHEN, M.
1823
COHEN, M.I.
1735, 1774
COHEN, W. N.
1477
COHN, I., JR.
1939
COLCOCK, B.P.
1534
COLIN-JONES, D.G.
1397
COLLIN, P.P.
1333
COLLINS, W.J.
1232
COLLIS, C.H.
1332
COLMAN, J.V.L.
1250
COLODNY, A.H.
1582
COLTON, D.G.
1115
COLTORTI, M.
1803
COMBEMALE, B.
1424
COMOY, E.
1169
COMPORTI, M.
1142
CONDON, R.F.
1522*
CONKLIN, E.F.
1764*
CONN, J.H.
1459
CONNOLLY, D.P.
1446
CONRAD, M.F.
1763*
CONSORTI, P.
1105
COOK, G.C.
968
COOK, J.D.
1062*, 1063*
COOK, P.J.
1332
COOKE, W.T.
1467*
COOKSON, J.B.
1966
COOPER, P.
1425
COPE, V.
1700
COPELAND, H.
1903
COPER, H.
1807
CORBIN, J.G.
1056*
CORCINO, J.J.
1505
CORDA, J.
1669
CORLETT, R.G.
1654*
CORNETTE, W.
1339
CORNOG, J.L.
1520*
CORRIGALL, A.
1073
COSSART, Y.E.
1785
COSTER, D.
1670
COSTOPOULOS, L.B.
1904
COTTON, P.B.
1206, 1218
COUCH, R.B.
1893
COULBOIS, J.
1750
COUTURE, Y.
1039
COWEN, A.E.
1257
COWLEY, D.J.
1031, 1398
COX, A.G.
1384*
COX, E.V.
1626
CRAIG, P.H.
956
CRAMER, K.R.
1305
CRAMPTON, R.F.
950*
CREAN, C.R.
997*
CREAN, G.P.
998*, 1393*
CREE, J.E.
1601
CREUTZFELDT, W.
1002*
CROFT, D.N.
1218
CROOK, J.N.
1939
CROOM, R.D., III.
1416
CROTTE, C.
1081
CROYDON, M.
1021
CRUM, E.
1765
CUARTAS, F.I.
1232
CUATRECASAS, P.
1144
CULLEN, P.K.
1599
CUNHA, A.
1490
CURRY, S.H.
1840
CURTIN, F.G.
1263
CUTLER, M.G.
1283
DA COSTA, J.L.
1835
DAAE, L.N.W.
1125
DAMGAARD NIELSEN, S.A.
1399, 1407
DANOVSKII, L.V.
1412
DARDANONI, L.
1803
DARDEN, E.B., JR.
941
DAS, M.M.
1295, 1356
DATO SALLEH, H.
1612
DATTA, D.V.
1674*, 1951*
DAVE, K.S.
1304
DAVID, J.
1889
DAVIDSSON, L.
1545
DAVIES, J.D.
1468*
DAVIES, R.J.
1218
DAVIS, L.L.
1378
DAVIS, W.M.
1292*
DAWSON, A.M.
1470*, 1482
DAY, N.E.
1321
DE BRITO, T.
1954
DE CARVALHO, C.
1490
DE CATTONI, S.D.
1168
DE DOMBAL, F.T.
1922
DE FRANCHIS, R.
1060*
DE JONG, U.W.
1321
DE LA ROSA, J.
1237
DE LAS CASAS ALONSO, P.
1237
DE PRADO ISLA, L.H.
1660
DE ROISSARD, J.P.
1668
DE SOUSA, J.S.
1490
DE WAAL, F.C.
1370
DEAN, A.G.
1893

DEBAS, H.T.
1552
DEBRAY, C.
1169
DECKERT, F.W.
1098
DEFTOS, I.J.
1344*
DEHLIN, O.
1810
DEL MASTRO, S.
1132
DEL NINNO, E.
1060*
DEL ROSARIO SPETALE, M.
1057*
DEL VECCHIO BLANCO, C.
1803
DELANEY, J.P.
1877
DELAS, N.
1750
DELAVIERRE, P.
1460
DELEANU, E.
1730
DELELLIS, R.A.
1675*
DELUMEAU, G.
1204
DEMEESTER, T.R.
1655
DEMLING, L.
1256, 1341*, 1579
DENBOROUGH, M.A.
1698
DENCKER, H.
951, 1651
DENK, H.
1173*
DENT, D.M.
1410
DENT, R.I.
1344*
DENTAN, T.
1330
DEODHAR, L.P.
1888
DEODHAR, S.D.
1519*
DEROIDE, J.P.
1750
DERRICK, W.
1553
DESBAILLETS, L.
1910
DESBUQUOIS, B.
1144
DESGREZ, A.
1190*
DESJARDINS, J.G.
1333
DESMOND, A.M.
1388*
DETWILER, P.
1138
DEUTSCH, G.F.
1786
DEYHLE, P.
1016, 1017
DHANASEKAR, D.J.
1889
DHAR, P.
1934
DHUMEAUX, D.
1705
DI LUZIO, N.R.
1076
DICHOSO, C.
1788
DICK, R.
1366
DIECKHOFF, J.
1775
DIEP, H.
1685
DIFREL, H.
1872
DIETRICHSON, O.
1793*
DIMAGNO, E.P.
1643
DINNER, M.
1931
DINTSMAN, M.
1622
DIOGUARDI, N.
1060*, 1707
DIPIAZZA, M.
1138
DOCKERTY, M.B.
1343*
DODD, G.D.
1235
DODDS, W.J.
1562
DOE, W.F.
1484*, 1485*
DOLIN, R.
1926
DOMSCHKE, W.
1341*
DONALDSON, R.M.
1510
DORFFEL, W.
1776
DORFMANN, H.
1789
DORN, A.
1014
DOTEVALL, G.
1631
DOTTER, C.T.
1884*
DOUGLAS, G.
1868
DOUGLAS, R.G., JR.
1893
DOWLING, B.L.
1351
DOWLING, R.H.
1854
DOWN, P.F.
945*
DOWNEY, E.L.
1903
DOZOIS, R.R.
1245
DRAGO, S.
1575
DRAINER, I.K.
1299
DRAK, J.
1442
DRAPANAS, T.
1818*
DREESMAN, G.R.
1787
DREWS, J.
1262
DROTMAN, R.B.
1055*, 1064*
DUBRASQUET, M.
1883*
DUDLEY, F.J.
1755*
DUDUNKOV, Z.
1588
DUFFY, J.L.
1806*
DUFOUGERAY, F.
1890
DUGAL, B.S.
1068
DUGAN, R.E.
1129
DUJOVNE, C.A.
1743
DUNEA, G.
1738*
DUNN, G.D.
1234
DUNNIGAN, J.
1039
DUNNILL, M.S.
1445
DUNPHY, J.E.
1846*
DUPONT, H.
1926
DUPONT, H.L.
1902
DURKIN, E.J.
1097
DUTHIE, H.L.
1025
DUTTA, N.K.
1177
DVIVEDI, M.S.
1713
DYCKHOFF, P.
1567
DYER, N.H.
1470*, 1482
DZHAUBAEV, M.KH.
1948
EARLE, E.
1614*
EASTWOOD, M.A.
1449
EATON, S.B., JR.
1628
EBERLEIN, W.R.
1507

ECKERSTORFER, R.
1173*
EDDLESTON, A.L.W.F.
1796*
EDWARDS, A.V.
1143
EFRON, G.
954
EGGERMONT, E.
1364, 1497
EHRLICH, A.N.
1895
EIDELLOTH, G.
1711
EISALO, A.
1742
EISEMAN, B.
1385*
EISNER, M.
1547
EKELUND, K.
976*, 989, 1184
EKMAN, M.
981*
EKNOYAN, G.
1788
EL-DALI, M.
1946
EL-HAWARY, M.F.S.
1946
EL-KEMMAH, B.
1724
EL-SAADANI, A.M.
1724
ELDER, J.B.
997*, 998*, 1393*
ELFONT, E.A.
1115
ELGJO, K.
1737*
ELIAS, E.G.
1174
ELIASTAM, M.
1744
ELKINS, R.C.
1655
ELLIOTT, G.B.
1568
ELLIS, H.
1930
ELLISON, M.R.
1738*
ELSTER, K.
1275, 1368, 1554
ELWIN, C.E.
1000*
ELWOOD, J.C.
1121, 1122
EMAS, S.
1430
ENGE, I.
1084, 1183
ENGELBRECHT, W.
1273
ENGLERT, E., JR.
952
ENRIQUEZ GONZALEZ, L.
1649
ERB, W.
1816
ERDOS, E.G.
1162
ERFAN, A.
1724
ESPIRITU, C.R.
1822*
ESPMARK, A.
1758*
ETALA, E.
1323
ETIENNE, J.P.
1789
EVANS, D.
1484*
EVANS, G.A.
1468*
EVANS, G.W.
1263
EVANS, J.A.
1223
EVANS, J.C.W.
1596
EVANS, J.T.
1174, 1581
EXIGA, J.
1781
EXSS, R.
1837
EXTON, J.H.
1056*
FABER, V.
1793*
FABRICIUS-BJERRE, N.
1549
FAGERBERG, G.
1631
FAGIOLO, U.
1803
FAIN, S.N.
1569
FAIN, W.R.
1459
FANG, V.S.
1075
FARABOLLINI, F.
930
FARID, Z.
1953
FARINI, R.
1803
FARMER, R.G.
1280, 1611
FARRELL, R.L.
978*
FAST, D.
1034*
FAUCONNET, M.H.
1798*
FAULK, W.P.
1194*
FAUR, A.
1495
FAUST, H.
1915
FAUSTO, N.
1074
FAVERDIN, C.
1548
FAWCETT, N.
1233
FEBRUARY, A.W.
1757*
FEDSON, D.S.
1887*, 1926
FEIEREIS, H.
1541
FEIGELSON, J.
1699
FELDMANN, G.
1705
FENGER, C.
1399, 1407
FENGER, H.J.
1361
FENNWARTH, B.
1546
FENTON, B.H.
1021
FERNANDEZ-NOGUES, F.
1693
FERRAND, B.
1694
FERRUCCI, J.T.
1529
FERRUCCI, J.T., JR.
1628
FEURLE, G.
1002*
FEVERY, J.
1071
FIELDING, J.F.
1351, 1440, 1467*
FIEVE, G.
1376, 1632
FIGUEROA, R.B.
1509
FILIPPINI, L.
1809
FINCH, C.A.
1062*, 1063*
FINDEISEN, B.
1264
FINKELSTEIN, R.A.
1925
FINLAYSON, N.D.C.
1798*
FISCHER, G.
1771
FISCHER, J.E.
1344*
FISCHER, K.
1236
FISCHERMAN, K.
1028
FISH, J.C.
1662
FITSCHA, P.
1088
FITTS, W.T.
1531
FIXA, B.
1015
FIZETTE, N.
1130

FLATMARK, A.
1084, 1183
FLEISCHER, K.
1667
FLEMING, M.P.
1221
FLETCHER, M.J.
1720
FLYE, M.W.
1324
FLYNN, R.F.
1220
FONTANA, R.S.
1437
FOREMAN, J.K.
1332
FORREST, J.A.H.
1815
FORSSMANN, R.
1252
FOSTER, J.H.
1940
FOX, H.
1866
FRANCO, R.
1242
FRANK, M.M.
1894
FRANKLIN, R.
1535
FRASER, C.
1176
FREDDI, O.E.
1452
FREEDLAND, R.A.
1064*, 1117
FREEMAN, C.
1111
FRENCH, L.W.
1617
FRENCH, T.J.
1441
FRIESEN, S.R.
1346*
FRILEY, M.D.
1868
FRITH, L.
1073
FRONEK, K.
1436
FRUHMORGEN, P.
1256
FUCHS, H.
1913
FUCHS, H.F.
1369
FUJIOKA, R.S.
1787
FUKUI, I.
1491
FUKUNISHI, R.
1148
FULLEN, W.D.
1938
FUNDING, J.
1028
GAAFAR, S.M.
1955
GABR, M.
1946
GALAMBOS, J.T.
1892
GALATULAS, I.
1132
GALLUS, A.S.
1756*
GAMMILL, S.L.
1205
GAMPONIA, P.J.
960
GANESAN, T.K.
1968
GANGOLLI, S.D.
950*
GANS, H.
1834
GAPPAROV, M.M.
1007
GARCIA-MORAN, M.
1100
GARCIA, O.L.
1509
GARDNER, J.D.
1906
GARIBALDI, R.A.
1779
GARRISON, C.O.
1437
GARTNER, L.M.
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GASANOV, G.D.
1542
GASTELL, D.O.
978*
GASTON, P.J.
1882
GAULT, H.
1759*
GAULTIER, C.
1309
GAZZANIGA, A.
1832
GEAR, M.W.L.
1918
GEISENHAINER, G.
1208
GELFAND, M.D.
1300
GENT, A.E.
1206
GERBEAUX, J.
1309
GERBER, M.A.
1773
GERHARDT, P.
1239
GERLICH, W.
1212
GEROLAMI, A.
1081
GEUMEI, A.
1004
GHEORGHIU, S.
1730
GHERGHESCU, B.
1512
GHERMAN, I.
1638
GHIRCOIASU, T.
1495
GHOSH, B.C.
1296, 1335
GIBBONS, G.F.
1053*
GIBBS, K.
1678*
GIBBS, N.M.
1617
GILAT, T.
1219
GILKES, R.
1284
GILLESPIE, G.
997*, 998*, 1393*
GILLESPIE, I.E.
997*, 998*, 1393*
GILLETT, D.J.
1103
GINSBERG, A.L.
1763*
GIORDANO, C.
1781
GIRARD, M.
1637
GIRDWOOD, R.W.
1293*
GIUSTINO, V.
1755*
GJONE, E.
1737*
GLANVILLE, J.N.
1322
GLASS, G.B.J.
1191*
GLIEDMAN, M.L.
1739*
GO, V.L.W.
1643
GOEBELL, H.
1013
GOEPFERT, J.M.
1159
GOFMAN, A.M.
1569
GOFTON, J.P.
1648
GOLD, P.
1905
GOLDBERG, D.M.
1041, 1233
GOLDBERG, W.M.
1567
GOLDFINGER, S.E.
1745
GOLDING, P.L.
1796*
GOLDSTEIN, P.J.
1066*
GOLDSTEIN, W.B.
1878
GOLTERMANN, J.
1640, 1666
GOMPERTZ, D.
1485*

NUMBERS FOLLOWED BY AN ASTERISK INDICATE ABSTRACTS. OTHER NUMBERS REFER TO CITATIONS.

GONCALVES, C.S.
1808
GONZALEZ-LICEA, A.
914*
GOODMAN, I.
973*, 980*
GOODWIN, N.E.
1149
GORBACH, S.L.
1522*, 1887*
GORBATOW, O.
1402
GORBUNOV, J.V.
1911
GORDON, R.S., JR.
1906
GOTHLIN, J.
951
GOTTSCHALK, A.
1199
GOUGH, A.D.
1615*
GOUGH, M.H.
1918
GOULON, M.
1565
GOUTIER, R.
1113
GOYAL, R.A.
1304
GOYAL, R.K.
1899
GRADY, G.F.
1780
GRAF, J.
1147
GRAMATICA, L.
1657
GRAND, R.J.
1514, 1582
GRANT, A.K.
1281
GRASSO, G.
1105
GRAVLEE, J.F.
1903
GRAY, L.W., JR.
1939
GREEN, F.H.Y.
1866
GREENBERGER, N.J.
910*, 1313
GREENE, A.G.
1222
GREENE, L.
1475
GREGG, M.B.
1779
GREGORIE, H.B., JR.
1318
GRENET, P.
1709
GREY, R.D.
918*
GRILLO, M.A.
925
GRODSINSKY, C.
1597
GROENQVIST, B.
959
GROFF, D.B.
1865
GRONWALL, R.
1086
GROSBUIS, S.
1565
GROSDIDIER, J.
1632
GROSS, J.
1761*
GROSS, S.
1260
GROSSMAN, M.I.
1045, 1943
GROSSOWICZ, N.
1761*
GROVER, N.K.
1963
GROVER, S.L.
1951*
GRUNBERG, J.
1309
GRUTTNER, R.
1633
GUDMAND-HOYER, E.
1361
GUDOWSKI, G.
1775
GUELRUD, M.
1213
GUEROULT, N.
1789
GUERRE, J.
1852
GULATI, S.M.
1963
GULEVICH, E.V.
1948
GUMEDE, M.V.
1811
GUMP, F.E.
1469*
GUPTA, B.B.
1674*
GUPTA, K.K.
1964
GUPTA, M.C.
1748
GUPTA, P.S.
1513
GUPTA, R.L.
1116
GUPTA, S.
1700
GUTH, P.H.
1170*
GUTMAN, E.
1317
GUTMANN, I.
1127
GUTSTEIN, S.
954
GYORKEY, F.
1704, 1788
GYORKEY, P.
1704, 1788
HAAKE, U.
1271
HAAPANEN, E.
1760*
HABAL, M.B.
1265
HADORN, B.
1038
HAFF, R.C.
1555
HAGEMANN, R.F.
941
HAGUENAUER, J.P.
1321
HAKKINEN, I.P.T.
1945
HALAC, E.
1138
HALL, J.G.
963
HALLER, C.
1102
HALPIN, T.F.
1728*
HAM, J.M.
1250
HAMEED, S.
1748
HAMILTON, G.B.
1232
HAMILTON, J.R.
1916
HAMILTON, R.J.
1501
HAMMAKER, L.
909*
HAMMICK, J.W.
1225
HAMPSON, F.
1626
HAMPTON, J.C.
915*
HANEL, H.K.
1549
HANEY, R.
1061*
HANSEN, J.D.L.
1489
HANSKY, J.
1009, 1019, 1340*, 1390*,
1394*, 1417
HARDY, D.G.
1473
HAREL, C.
1708
HARPER, A.E.
1080
HARPER, S.C.
1056*
HARRIS, J.C.
1902
HARRISON, B.D.W.
1515
HARRISON, R.C.
1465
HARRY, J.G.
1492
HART HANSEN, O.

1026
HART, J.
1867
HARTEL, W.
1414
HASKER, W.F.
1432
HATCH, F.F.
1779
HATCH, M.H.
1779
HATCHER, C.R., JR.
1310
HATHAWAY, A.E.
1772
HAUG, H.P.
1241
HAVARD, C.W.H.
1919
HAVIA, T.
1448, 1545
HAXTON, J.A.
1967
HAYNES, B.W., JR.
1525*
HAYS, D.M.
1082
HEALD, R.J.
1284, 1524*
HEDNER, P.
1192*, 1193*
HEGER, N.
1723
HEIMBERG, M.
1051*, 1130
HEIRWEGH, K.P.M.
1071
HEISLER, S.
1034*
HEITMANN, P.
1291*
HELD, B.
1475
HELMER, J.
1632
HELTBERG, J.
1406
HEMS, D.A.
1070
HEMSTED, F.H.
1626
HENDERSON, R.D.
1328
HENDRIX, T.R.
1294*
HENNING, H.
1258
HENRIKSEN, F.W.
1251
HENSLEY, G.T.
1562
HENSON, D.
1907
HERFARTH, C.
1719
HERMANN, R.
1669
HERNDON, J.H., JR.
1680
HERRINGTON, J.L., JR.
1364
HERRERA PINTO, C.
1242
HERSH, T.
1899
HERSHKO, C.
1062*, 1063*
HERZBERG, J.J.
1908
HEWITT, D.
1859
HIATT, R.B.
973*, 980*
HICKMAN, R.
1149, 1410
HIDAYAT, M.A.
1967
HIGASHINO, K.
1094
HILL, B.J.
1029
HILLEMAND, P.
1460
HILLENBRAND, P.
1090, 1139
HIMMELFARB, E.
1827
HING, T.L.
1956
HINKEL, G.K.
1727*
HINNEN-BOUWMANS, C.
1123
HINTZ, H.F.
956
HIRAI, Y.
1082
HIRSCHOWITZ, B.I.
996*
HIRSH, J.
1756*
HISLOP, I.G.
1281
HO, M.S.L.
920, 926
HOBBS, J.R.
1484*
HODGE, A.J.
1018
HODGINS, D.S.
994*
HOERR, S.O.
1420
HOFFBRAND, A.V.
1384*
HOFFER, P.B.
1199
HOFFMAN, E.
1076
HOFSTAD, T.
948*
HOGAN, W.J.
1562
HOGUE, D.F.
956
HOLCOMB, G.W., JR.
1940
HOLDSWORTH, C.D.
1817*
HOLLAND, P.C.
966
HOLLAND, P.V.
1282, 1792
HOLLE, F.
1423
HOLLE, G.
1423
HOLLEY, K.E.
1437
HOLLINGER, F.B.
1787
HOLLIS, J.B.
979*, 991
HOLM, C.
1952
HOLMES, A.W.
1744
HOLMES, T.W., JR.
1307
HOLSCLAW, D.
1627*
HOLST-CHRISTENSEN, J.
1549
HOLT, P.R.
958
HOLTEN, D.
1126
HOLTON, J.B.
1732
HOLTZAPPLE, P.G.
1507
HOLYOKE, D.
1886*
HOLZKNECHT, R.
1226
HOLZNER, J.H.
1173*, 1207
HONG, S.H.
1377
HONG, S.N.
1358
HOON, R.S.
1964
HOOVER, W.H.
1178
HORAK, J.
1944
HORI, S.H.
1096
HORLICK, L.
1929
HORN, A.
1285
HORN, B.
1285
HORNICK, R.B.
1902, 1926
HORNING, I.
1771
HORNUNG, J.R.
1917
HORROCK, J.C.
1922
HORSTKOTTE, W.
1695
HOTZ, H.

965
HOWARD, R.J.
1877
HOWE, J.M.
1140
HOWELLS, T.H.
986
HRDLICKA, J.
923
HUANG, S.N.
1759*
HUANG, T.S.
1841
HUANG, T.T.
1662
HUDEPOHL, M.
1794*
HUGHES, F.S.R.
1608
HUGUET, C.
1104
HUGUET, J.
1657
HUGUIER, M.
1104, 1367
HUIZENGA, K.A.
1616*
HULAN, H.W.
1050
HUNG, W.T.
1841
HUNT, J.H.
1392*
HUNT, T.C.
1550
HUSBY, G.
1737*
HUTCHISON, G.
996*
IAKHONTOVA, O.I.
1770
IARTSEVA, A.M.
1692
IBER, F.L.
1486*, 1812
IDEO, G.
1060*, 1707
IHASZ, M.
1443
IL'IN, G.I.
1120
IMAHORI, S.
1581
IMLER, M.
1842
IMONDI, A.R.
1644
INBERG, M.V.
1448, 1545
INGELFINGER, F.J.
1896
INGEMAR, K.
1421
INOIATOV, I.M.
1569
IONESCU, M.I.
1293*
IRMER, W.
1252
ISDALE, J.
1855
ISHAK, K.G.
1820
ISHIKAWA, E.
1137
ISSA, I.
1004
IWATA, T.
1348
IYENGAR, B.
1963
IZANT, R.J.
1324
IZANT, R.J., JR.
1260
IZENSTARK, J.L.
1247
JAASKELAINEN, A.J.
1448
JACKSON, B.M.
1003
JACOBSEN, J.
1729
JACOBSON, E.
1962
JACOBSON, E.D.
994*, 1037*, 1891
JAFFE, E.
1880
JAGELMAN, D.G.
1930
JAIN, K.K.
1722
JALAN, K.N.
1518*
JAMES, A.E., JR.
1236
JAMES, J.H.
1344*
JANECKA, V.
1338
JANOWITZ, H.D.
1527*
JANSEN, J.
1370
JANSSEN, P.A.J.
992
JARNEROT, G.
1472
JARNUM, S.
1345*, 1506
JARVE, E.
1362
JEAN, J.Y.
1560
JEDRYCHOWSKI, A.
1090, 1139
JEFFAY, H.
1135
JEFFERISS, C.D.
1380
JENIS, E.H.
1677*, 1820
JENSEN, H.E.
1399, 1407
JENSEN, K.B.
1345*
JEWELL, L.D.
1805*
JO, N.
1509
JOHANNSON, F.
1013
JOHANSEN, J.K.
1592
JOHANSEN, K.
1653*
JOHANSEN, S.
1831
JOHANSON, K.J.
1164
JOHANSSON, C.
976*, 989, 1184
JOHNSON, A.G.
977*, 1849
JOHNSON, E.A.
1118
JOHNSON, L.R.
993, 1037*
JOHNSON, R.J.
1553
JOHNSON, T.O.
1203
JOHNSTON, G.W.
1615*
JONES, A.R.
1728*
JONES, C.D.P.
1563
JONES, E.W.
1440
JONES, J.J.
1494
JONES, T.C.
1893
JONES, W.M.
1563
JORGENSEN, M.
1681, 1856
JORGENSEN, S.P.
1544
JORKE, D.
1718, 1747, 1876
JOSEPH, A.J.
1353
JOVIN, G.
1512
JUSSAWALLA, D.J.
1298
JUSSILA, J.
1426, 1450
KAGER, L.
1661
KAHN, L.B.
1610
KAIRIS, N.M.
1791
KAISER, E.
1088
KAKEGAWA, T.
1314
KAKEHI, K.
1156*
KAKEMI, K.

944*
KALLEHAUGE, H.E.
1361
KALSER, M.
1629
KALUS, M.
1517*
KAMEL, G.
1724
KAMENETS, L. IA.
1089
KANENGONI, F.
1494
KANZLER, G.
1275
KAPLAN, A.I.
1830
KAPLAN, A.P.
1949*
KAPLAN, E.L.
1029
KAPUR, B.M.L.
1048, 1539
KARLISH, A.J.
1626
KARLSSON, I.
1106
KASPER, H.
1483, 1667
KATER, L.
1790
KATTERMANN, R.
1697
KAWAJI, K.
1148
KAWAZOE, K.
1107
KAY, A.W.
997*, 998*, 1393*
KAYASSEH, L.
1272
KAYE, M.D.
974*
KEDDIE, N.C.
1920
KEHAYOGLOU, K.A.
1791
KEIGHLEY, M.R.B.
1293*
KEIL, L.
1376
KEITTEVUTI, B.
1955
KELEN, A.F.
1772
KELLER, R.J.
1696
KELLUM, J.M., JR.
1655
KELLY, M.
1916
KELMAN, L.
1073
KEMP, A.
1796*
KEMP, D.R.
1645
KEMPF, F.
1329
KENDALL, F.M.
982*
KENDLER, J.
1119
KENNEDY, B.W.
1562
KENNEDY, P.S.
1899
KENNEDY, T.L.
1615*
KENT, G.
1813
KENT, T.H.
1578
KERN, E.
1461, 1843
KERNITSKAIA, N.S.
1604
KERREMANS, R.
1339, 1364
KETTERER, H.
1002*
KETTNER, W.
1623, 1771
KHADZHIDEKOV, G.
1240
KHARE, K.C.
1713
KHAW, K.T.
1514
KHILNANI, M.T.
1696
KHODYKIN, A.U.
1663
KIENE, S.
1589
KIERAN, J.H.
1263
KIIL, J.
1924
KILLINGBACK, M.J.
1609
KIM, C.K.
1358
KIM, M.C.C.
1575
KIM, S.K.
1466
KIM, W.J.
1038
KIM, Y.S.
1712
KIMURA, K.
934
KIMURA, T.
944*
KINAWI, M.
1724
KING, D.M.
1648
KING, E.
1817*
KINGSTON, C.W.
1432
KINKHABWALA, M.
1827
KINTZEL, H.W.
1727*
KINZIE, J.L.
1906
KIRKPATRICK, J.R.
1101, 1245
KIROV, S.
1588
KIRSCH, R.E.
1073
KIRSNER, J.B.
1619
KITAMURA, T.
1096
KLEIN, K.M.
1085
KLEIN, M.S.
1933
KLEINMAN, M.S.
1503
KLEMENT, O.
1285
KLEMPA, I.
1423
KLESSEN, C.
935
KLIMPEL, L.
1429
KLINGNER, R.
1210
KLIPSTEIN, F.A.
1505
KLOTZ, A.P.
1234
KNIESER, M.R.
1677*
KNIGHT W, II.
1669
KNOX, G.E.
1947
KOBAYASHI, A.
1839
KOCH, H.
1256, 1909
KOCHNEV, O.S.
1659
KOCHUBEI, V.G.
1851
KODITZ, H.
1909
KOHLER, H.
1211, 1695
KOILPILLAI, H.
1889
KOJECKY, Z.
1944
KOMARKOVA, O.
1015
KOMEDA, T.
1491
KONDAKOVA, V.G.
1083
KONO, T.
1491
KONTTINEN, A.
1742
KONTUREK, S.J.
995*
KONZ, B.

1423
KORMAN, M.G.
1009, 1019, 1340*, 1390*, 1394*, 1417
KORN, P.
1147
KORNER, B.
1530
KOSAKA, K.
1095
KOSMIDIS, J.C.
1784
KOTHARE, S.N.
1353
KOVALENKO, O.A.
1186
KOWALEWSKI, K.
1010
KRAIN, L.S.
1381, 1857
KRAJ, M.
1769
KRAMAR, R.
1088
KRAMER, J.W.
1117
KRAMER, M.F.
1047
KRAMHOFT, J.
1869
KRATZER, G.L.
1537
KRAUSE, D.
1226
KRAUSE, I.
1590
KRAWCZYNSKI, K.
1762*
KRECKEL, C.
1414
KREEL, L.
986
KREICHMAN, G.S.
1238
KREMEN, A.J.
1917
KREUSCH, L.
1475
KRIPPAEHNE, W.W.
1937
KRITZINGER, E.E.
1494
KRIVENKO, F.V.
1287
KRIVINKA, R.
1721
KROHL, R.
1816
KROHN, K.
1396, 1798*
KROLL, J.L.
1752
KRONBORG, O.
1389*, 1400
KRUSE, P.
1480
KUBALSKA, J.
1962
KUDCHODKAR, B.J.
1929
KUDVA, R.M.
1116
KUHARA, H.
1375
KULISEK, V.
1858
KULSDOM, N.
989, 1184
KUMAR, D.
939
KUMAR, S.
1177, 1748
KUMAR, V.
1166
KUNE, G.A.
1670
KUPCHIK, H.
1934
KURTZ, J.E.
1446
KUSTER, G.G.R.
1343*
KUTTY, M.K.
1850
KWOLEK, A.
940
KWON, O.S.
1377
KWONG, N.K.
1025
LAGACHE, G.
1474
LAGERLOF, H.O.
976*, 989, 1184
LAGUARDA, R.
1830
LAGUNA, V.
1629
LAL, D.
1583
LAMBRECHTER, R.
1088
LAMOUREUX, J.
1708
LAMPE, K.
1471, 1794*
LANDER, J.J.
1792
LANGE, H.
1244
LANGE, W.
1211
LANTORP, K.
1472
LANZ, U.
1325
LAOR, J.
1438
LAPERRIERE, D.
1333
LARCAN, A.
1632
LARMI, T.K.I.
1656
LARSSON, I.
989, 1184
LAUNOIS, J.P.
1741
LAUZE, S.
1708
LAZARIDES, D.
1636
LE BOUVIER, G.L.
1766
LEADER-WILLIAMS, L.K.
1784
LEAK, D.
1567
LEAPER, D.J.
1922
LEBAUER, S.
1313
LEBEL, J.S.
1519*
LEBENTHAL, E.
1438
LECCE, J.G.
955
LEE, J.F.
1687
LEGER, L.
1330
LEGGE, A.M.
943*
LEHNERT, U.
1782
LEHY, T.
1890
LEICHTLING, J.J.
1466
LELBACH, W.K.
1814
LEMAIRE, R.
1367
LEMORT, J.P.
1190*
LENNARD-JONES, J.E.
1397
LENNARTZ, K.J.
931
LENOIR, P.
1694
LENTZ, P.E.
1076
LENZ, J.
1414
LEPORDA, G.
1102
LEPORE, M.J.
1764*
LERNER, B.
1827
LERNER, S.
1728*
LEROY, P.
1071
LESAGE, R.
1306
LESCHALLIER DE LISLE, L.
1204
LESTRADET, H.
1709
LEV, R.
946*

LEVEILLE, G.A.
1079
LEVIN, G.F.
1214
LEVIN, I.G.
1007
LEVINE, S.M.
991
LEVINSON, R.A.
952
LEVITAN, R.
1583
LEVITT, M.D.
1897
LEVY, R.
1750
LEWIS, B.
1757*
LEWIS, L.D.
1457
LEWIS, M.I.
1538
LEWITUS, Z.
1438
LEYMARIOS, J.
1169
LEZHAVA, IA. P.
1422
LIAVAG, I.
1342*
LICASTRO, R.
1202
LIEBER, C.S.
1069
LIEBERMANN-MEFFERT, D.
1413
LIEHR, H.
1838
LIEPA, F.
1587
LIGHT, R.W.
1294*
LIGUORY, C.
1367
LIM, H.L.
1835
LIM, T.S.
1246
LIM, Y.F.
1358
LINCHENKO, I.F.
1701
LINDAHL, F.
1652*, 1869
LINDBERG, S.
1661
LINDE, K.
1909
LINDEMANN, B.
1695
LINDSKOV, J.
1399, 1407
LINSCHEER, W.G.
1486*
LIPPERT, H.
1127
LISSNER, J.
1423
LITT, I.F.
1735, 1774
LITTLE, C.
1965
LIU, K.
1581
LLOYD-STILL, J.D.
1514
LOCALIO, S.A.
1100
LOCKARD, V.G.
1052*
LOCKHART-MUMMERY, H.E.
1524*
LODOLA, E.
1832
LOEFFLER, P.G.
1241
LOFFLER, A.
1809
LOGINOV, A.S.
1288, 1692
LOH, K.R.W.
953
LOLIS, D.E.
1791
LOMBA VIANA, R.
1969
LONGMIRE, W.P., JR.
1885*
LONGMUIR, I.S.
1145
LOOK, D.
1258
LORD, R.S.A.
1932
LORENZ, D.
1014
LORENZ-MEYER, H.
964
LOUW, J.H.
1576, 1875
LOWE, J.E.
956
LUBCKE, P.
1226
LUCAS, C.R.
1756*
LUCHTRATH, H.
1836
LUCKEY, T.D.
1502
LUCKING, T.
1633
LUDERS, C.J.
1258
LUNDERQUIST, A.
1193*
LUNDQVIST, G.
1049
LUTTWAK, E.M.
1477
LUYKEN, R.
1511
LYSOV, V.V.
1120
MA, R.Y.P.
926
MACHTEY, I.
1438
MACKENZIE, I.L.
1510
MACKIE, D.B.
1171*
MADALINSKI, K.
1762*
MADDEN, J.W.
1061*, 1292*
MADON, E.
1216
MADSEN, P.
1026, 1400
MADWAR, K.R.
1724
MAESS, M.
1355
MAGAZANIK, R.L.
1287
MAGNIUS, L.O.
1758*
MAGOTRA, M.L.
1434
MAHRAN, A.A.
1967
MAIER, B.R.
1502
MAJUMDAR, P.
1603
MAK, K.
912*
MAKHACHEV, M.O.
1542
MAKINO, H.
1375
MALAMUD, D.
1032*
MALDONADO, M.
1505,
MALDONADO, N.
1505
MALERCZYK, V.
1711
MALLET-GUY, P.
1668
MALMSTROM, J.
1406
MALT, R.A.
1403, 1864
MALVAR, P.R.
1540
MANCINI, M.
1757*
MANN, T.P.
1601
MANNFELD, U.
1703
MANSBACH, C.M., II.
1167
MAO, C.C.
994*
MARAGALL, S.
1799
MARCHESI, V.T.
1526*
MARGULIS, A.R.
1628
MARITZ, V.M.
1698

MARKS, G.S.
1065*
MARKS, I.N.
1441
MARSH, J.B.
1134
MARSHALL, M.L.
1820
MARTEL, A.J.
1232
MARTI CARTAYA, J.L.
1237
MARTIN, F.
1104
MARTIN, L.W.
1533
MARTINEZ, F.
1249
MARTINEZ-MALDONADO, M.
1788
MARTINI, G.A.
1795*
MARTINI MAURI, M.M.
1216
MARTINS, J.
1969
MARX, S.
1745
MASAREI, J.R.
1018
MASSIMO, C.
1326
MASTERS, Y.F.
1910
MATHAN, V.I.
1510
MATHESIUS, V.J.
1731
MATHIEU, P.
1632
MATSUMOTO, K.
1834
MATSUTAKA, H.
1137
MATTHEWS, D.M.
950*
MATTHEWS, E.K.
1036*
MATTOCKS, A.R.
1093
MAVRIDI, D.I.
1161
MAXWELL, J.D.
1840
MAY, G.
1212
MAZET, J.L
971
MAZURE, P.A.
1315
MCADAM, I.W.J.
1950*
MCCAFFREY, J.
1432
MCCANN, A.P.
1922
MCCARTHY, D.M.
1187*
MCCARTHY, H.F.
1263
MCCARTHY, J.G.
1532
MCDERMOTT, W.V., JR.
1821*
MCDONALD, I.
1176
MCDONOGH, D.
1357
MCDONOUGH, J.J.
1938
MCGEARY, H.M.
1257
MCGEE, J.O.
913*
MCGILLIARD, A.D.
962
MCGLADDERY, W.F.
1573
MCGUIRE, H.H., JR.
1525*, 1600
MCHUTCHON, B.
1489
MCKENNA, P.J.
1764*
MCKENZIE, A.D.
1568
MCLEOD, D.A.
1772
MCMANUS, J.P.A.
1518*
MCMICHAEL, S.
1768
MCNAMARA, H.
1735
MCNEELY, B.U.
1618
MCNEILL, L.K.
1501
MCPEAK, C.J.
1710
MCSWAIN, B.
1535
MEDLINE, A.
1805*
MEDLINE, N.M.
1805*
MEEROFF, M.
1259
MEEUWISSE, G.
951
MEHLMAN, M.A.
1092, 1115
MELGAR, E.
1509
MELHORN, D.K.
1260
MELLIN, H.E.
1254
MELMED, R.N.
1187*
MELNICK, J.L.
1787
MENDE, S.
1837
MENDOZA, J.P.
1822*
MENGE, H.
964
MENGUY, R.
1910
MENICK, F.
1575
MENOZZI, I.
1803
MENZEL, K.
1736
MERCADIER, M.
1685
MERCADIER, M.P.
1702
MERCHANT, F.J.
1128
MERCULIEV, E.
1512
MERK, F.B.
1675*
MERSON, M.H.
1294*
MESSINGER, N.H.
1879
MEYER-BURG, J.
1253, 1261, 1269, 1634
MEYER, J.H.
1045
MGBODILE, M.U.K.
1099
MIA, A.S.
1086
MIDDLETON, P.H.
1440
MIDTVEDT, T.
1160
MIEDERER, S.E.
1016
MILLER, H.R.P.
932
MILLER, R.E.
975*
MILLER, W.T.
1531
MILLMAN, I.
1759*
MILLMAN, M.
1861
MILNE, M.D.
1515
MILNE, P.Y.
1608
MILNER, J.
1859
MINICK, O.T.
1813
MINICCNI, P.
1204
MINKOWITZ, S.
1827
MIR-MADJLESSI, S.H.
1611
MIRZAEV, A.P.
1427
MISHALANY, H.G.
1435
MISHELL, D.R.
1654*

MISIEWICZ, J.J.
1942
MISRA, R.C.
1513
MISRA, R.N.
1959
MITCHELL, C.G.
1796*
MITCHELL, W.D.
1449
MITCHISON, R.S.
1384*
MITRA, A.
1409
MITRA, R.C.
1887*
MITROPOULOS, K.A.
1053*
MITSCHKE, I.
1776
MITSUDA, H.
957
MIYAR GONZALEZ, A.
1871
MODAN, B.
1867
MODIANO, C.
1326
MOELLER, D.D.
1234
MOHANDAS, D.
1847
MOLLA, A.M.
1497
MONACELLI, R.
1209
MONATH, C.
1215, 1329
MONDAL, A.
1887*
MONGA, J.N.
1713
MONTGOMERY, R.D.
1966
MOORE, A.R.
963
MOORE, T.L.
1934
MORA, M.
1705
MOREAUX, J.
1104
MORENO, J.
1168
MORETTIN, L.B.
1235
MORGAN, H.V.
1966
MORGAN, J.M.
1691
MORGAN, M.W.
1297
MORGANIT, A.
1707
MORI, K.
1834
MORIN, F.
917*
MORISOLI, L.S.
1057*
MORISSET, J.
1039
MORISSET, J.A.
1042, 1043
MORTAZAVI, S.H.
1225
MORTON, H.J.
1059*
MOSER, C.A.
1172*
MOSHANG, T., JR.
1507
MOSHKOWITZ, B.
1761*
MOSKOWITZ, H.
1827
MOSKOWITZ, R.W.
1765
MOSLEY, W.H.
1197*
MOTT, C.B.
1954
MOULD, G.P.
1840
MOUNIER-KUHN, P.L.
1321
MOUNTFORD, R.A.
1227, 1228
MOZHAYSKAYA, N.M.
1238
MUGASHE, F.
1328
MUJAHED, Z.
1223
MUKHERJEE, T.M.
916*
MULE, A.
1081
MULLER, D.
1771
MULLER, J.M.
1460
MULLER-WIELAND, K.
1625
MUN, N.V.
1604
MURIE, N.
1694
MURISON, J.
945*
MURPHY, E.L.
1936
MURPHY, J.J.
982*
MURRAY-LYON, I.M.
1580
MUSCHTER, K.
1874
MUSHER, D.R.
1901
MUSSA, G.C.
1216
MUSTATCA, N.
1303
MYNORS, J.M.
1308
MYREN, J.
1831
MYSHKIN, K.I.
1404
NACCARATO, R.
1803
NAEF, A.P.
1311
NAGANNA, B.
1224
NAGAYAMA, T.
921
NAGLER, F.P.
1772
NAGPAUL, C.
1119
NAGY, G.S.
1290
NAKAJIMA, K.
1082
NAKAJIMA, T.
1162
NAKAMURA, Y.
957
NAKAYAMA, H.
1158*
NAMBIAR, R.
1646
NANCE, F.C.
1939
NAPALKOV, P.N.
1673
NASR, K.
1225
NATANGELO, R.
1832
NATHENSON, G.
1735
NEAGU, M.
1303
NEDELCU, T.
1730
NEIBLING, H.A.
1266
NEIDERHISER, D.H.
1077
NELSON, H.G.
1928
NELSON HAMANA, H.
1594
NELSON, S.W.
1419
NESSELROD, J.P.
1599
NEUBURGER, P.
1883*, 1890
NEUMAN, M.
1741
NEUMAYR, A.
1462
NEVES, D.P.
1954
NEWCOMER, A.D.
1616*
NICE, C.M., JR.
1205
NICHOLAS, G.G.
1531

NICHOLS, R.L.
  1522*
NIELSEN, A.R.
  1408
NIELSEN, H.
  1481
NIELSEN, J.
  1399, 1407
NIELSEN, J.A.
  1408
NIELSEN, R.
  1592
NILOFF, P.H.
  1860
NISHIKAWARA, M.T.
  1097
NIXON, H.H.
  1188*
NOFAL, M.M.
  1967
NOGALLER, A.M.
  1911
NOLAN, P.
  1385*
NOLASCO, R.N.
  1712
NORDSTOGA, K.
  1898
NORDSTROM, C.
  1155*
NOREN, I.
  1279
NORMAN, A.
  1160, 1819*
NORTHFIELD, T.C.
  1584
NORTHRUP, R.S.
  1926
NORTON, L.
  1385*
NOVAK, G.M.
  1378
NOVIS, B.H.
  1441
NOWOSLAWSKI, A.
  1762*
NOZICKA, Z.
  1015
NUTT, H.
  1362
NYBERG, O.
  1402
NYE, L.
  1817*
NYHUS, L.M.
  1128, 1522*
NYLAND, B.
  1184
NYSTROM, G.
  1952
O'BRIEN, S.E.
  1567
O'CALLAGHAN, J.
  961
O'CONNELL, A.
  1759*
O'CONNELL, F.X.
  1357
O'CONNOR, J.J.
  1621
O'GRADY, F.W.
  1470*
O'HALLORAN, M.W.
  1281
O'REILLY, K.
  1613
OBERLANDER, J.
  1557
OCHSNER, S.F.
  1528
OECONOMOU, K.
  1372
OEHME, G.
  1771
OHBE, Y.
  1839
OHKAWA, H.
  984
OHLSSON, E.G.
  919*, 1179
OHNACKER, H.
  1753
OHRN, P.G.
  988
OHYA, F.
  1375
OKABE, S.
  1910
OKAMOTO, T.
  1314
OKUBO, K.
  1491
OKUMURA, M.
  1954
OLESEN, E.S.
  1383*, 1386*
OLESEN, H.
  1408
OLSSON, O.
  1267
OMER, A.H.S.
  1960
ONORI, L.
  987
OPPENHEIM, B.E.
  1199
ORD, M.G.
  1131
ORLIC, D.
  946*
ORLOWSKI, T.
  1442
ORNSHOLT, J.
  1653*
ORSKOV, E.R.
  1176
ORTMANN, G.
  1268
ORTORE, P.
  1360
OSHIMA, H.
  1274
OSOKINA, L.I.
  1692
OSTERGAARD, A.H.
  1530
OTTENJANN, R.
  1275
OTTO NUNEZ, M.
  1594
OVERWEG, N.I.A.
  973*, 980*
PACE-ASCIAK, C.
  1005
PAGLIARO, L.
  1803
PAI, K.N.
  1672
PAILLET, R.
  1781
PAINTER, N.S.
  1571
PALANI, P.M.
  1968
PALFRAMAN, J.F.
  1332
PALKEN, M.
  1553
PALLAVICINI, G.
  1418
PALME, G.
  1253, 1269, 1634
PALMER, H.M.
  1276
PALMER, R.H.
  1689
PALVA, H.L.A.
  1498
PALVA, I.P.
  1498
PANDE, R.S.
  1825
PANGANIBAN, W.
  1520*
PAOLUCCI, R.
  1431*
PARASHAR, S.K.
  1347
PARBHOO, S.
  1139
PARBHOO, S.P.
  1090
PARKES, J.D.
  1840
PARKS, T.G.
  1615*
PARONETTO, F.
  1773
PASCULESCU, G.
  1495
PASSARO, E., JR.
  1885*
PATEL, M.C.
  1825
PATHAK, I.C.
  1556
PATHAK, R.
  1713
PATRICK, R.S.
  913*
PATTERSON, J.T.
  1076
PATTINSON, J.N.
  1366

PAUL, F.
1017, 1243
PAUL, S.
1847
PAYNE, J.F.
1609
PEABODY, C.N.
1861
PEACOCK, F.E., JR.
1061*, 1292*
PEARSE, A.G.E.
1346*, 1639
PEARSON, C.K.
943*
PEARSON, F.G.
1328
PEARSON, K.D.
1894
PECAU, Y.
1699
PECK, D.A.
1598
PEDERSEN, S.A.
985
PEIPER, H.J.
1642
PELLETT, J.R.
1327
PEMBERTON, L.B.
1551
PEMBERTON, P.J.
1504
PENA, A.S.
1521*
PENTANGELO, C.
1229
PEQUIGNOT, H.
1852
PERASALO, J.O.S.
1742
PERCY-ROBB, I.W.
1518*
PEREIRA, F.E.L.
1808
PEREZ, R.
1699
PEREZAGUA CLAMAGIRANO, C.
1649
PERREAULT, G.
1333
PERRIER, C.V.
1559
PERRIN, D.
1204
PERRINS, D.
1566
PERRY, B.
1310
PERRY, P.M.
1468*
PERSSON, C.G.A.
981*
PERTTALA, Y.
1402
PERUMAL, J.R.A.
1957, 1958
PESKIN, G.W.
1029
PETERLIK, M.
1147
PETERMANN, J.
1014
PETERS, C.M.
1006
PETERSEN, H.
1040, 1961
PETERSEN, L.
1480
PETERSEN, O.H.
1036*
PETRI, C.
1163
PETRI, S.
1163
PETZOLD, D.
1269, 1634
PFEIFFER, C.J.
1006
PFITZMANN, K.F.
1464
PHILLIPS, R.W.
1457
PHILLIPS, S.F.
1415, 1912
PICCINI, D.
1360
PICHLER, E.
1873
PICKARD, D.W.
983
PIEHL, G.
1590
PIERAGNOLI COUTURE, E.
1751
PIERCE, N.F.
1153*, 1887*
PIESBERGEN, H.
1273
PIETRA, P.
969
PINEL, J.
1330
PINKERTON, J.A.
1940
PIPER, D.W.
1021, 1392*
PISANO, J.C.
1076
PISSIDIS, A.
1128
PIYACHON, C.
1201
PLANTE, R.
1708
PLCH, J.
1731
PLENERT, W.
1782
POE, R.H.
1683
POETSCH, H.
1423
POJER, N.
1329
POKROVSKII, A.A.
1007
POLAK, J.M.
1639
POLK, H.C., JR.
1536
POLLARD, M.
1181
POLYRAKIS, G.
1636
PONCE, L.
1297
PONKA, J.L.
1597
PONZALLI, M.
1326
POON, M.C.
1749
POORT, C.
1047
PORSTI, P.
1402
PORTER, J.W.
1129
PORTER, M.R.
1532
POULSEN, H.
1690, 1793*
PREAUT, J.
1376
PRINGLE, R.C.
1768
PRIOR, P.
1467*
PRITCHARD, G.R.
1250
PROSSER, C.L.
984
PROSSER, D.I.
1515
PURANDARE, S.M.
1888
PURCELL, R.H.
1282, 1792
PUSCHEL, J.
1775
PYRON, K.A.
1783
RACHMILEWITZ, B.
1761*
RACHMILEWITZ, M.
1761*
RACZ, W.J.
1065*
RADECKI, R.
995*
RAFFENSPERGER, J.
1378
RAMACHANDRAN, K.A.
1513
RAMACHANDRAN, S.
1957, 1958
RANCHOD, M.
1441, 1610
RANLOV, P.
1481
RANSON, J.H.C.
1100
RAO, S.N.
916*

NUMBERS FOLLOWED BY AN ASTERISK INDICATE ABSTRACTS. OTHER NUMBERS REFER TO CITATIONS.

RAOTMA, H.
1631
RATAJCZAK-MAJEWSKA, C.
1447
RAVINDRAN, P.
1672
RAY, M.
1295
RAY, S.C.
1295
RAYNHAM, W.H.
1576
RAZDAN, J.L.
1523*
RECORD, C.O.
1802
REDDING, M.E.
1881
REDDY, B.S.
1181
REDDY, C.R.
1738*
REDINGER, R.N.
1848
REDMOND, A.O.B.
1489
REEDER, D.D.
999*, 1003
REEVES, B.E.A.
1053*
REFI, M.
1443
REGENSBERG, C.
1190*
REHFELD, J.F.
1387*
REHM, W.S.
961
REICHMANN, J.
1463
REINHARDT, M.
1718
REINHOLD, J.G.
1157*
REISS, F.
1029
REME, H.
1439
REMINE, W.H.
1343*
REMMER, H.K.
1098
RENZI, G.
1306
RESNICK, R.H.
1812
REYEROS, R.
1642
REYNOLDS, D.G.
1923
REYNOLDS, R.M.
1560, 1712
REYNOSO, G.
1886*
RIBERA, M.T.
1657
RICHARD, R.
1330
RICHERT, D.A.
1121, 1122
RICHTER, E.
1778
RICHTER, W.R.
911*
RIDER, J.A.
1194*
RIECKEN, E.O.
1271
RIECKER, E.O.
964
RIESENFELD, G.
1401
RITCHIE, A.
1146
RITLAND, S.
1737*
RIVERA, R.A.
1686, 1767
RIVERO GONZALEZ, M.
1249
RIXON, R.H.
1059*
ROBERTS, C.I.
1584
ROBILOTTI, J.G., JR.
1764*
ROBINSON, J.W.L.
1500
ROBINSON, L.A.
1038
RODARTE, J.R.
1437
RODES, J.
1799
RODRIGUEZ GARAY, E.A.
1057*
ROESCH, C.B.
1591
ROGERS, C.G.
1108
ROGGIN, G.M.
1486*
ROKA, L.
1067*
ROLING, G.T.
978*
ROMEN, W.
936
ROMERO-TORRES, R.
1564
ROMMEL, K.
965
RONEN, O.
1219
RONVEAUX-DUPAL, M.F.
1152
RORSMAN, G.
1192*
ROSAI, J.
1526*
ROSARIO, B.
915*
ROSCH, J.
1884*, 1937
ROSCH, W.
1275, 1369, 1913
ROSCOE, P.
1815
ROSENAK, B.D.
975*
ROSENKRANZ, W.
1320
ROSS, A.P.J.
1845*
ROSS, C.A.C.
1768
ROSSIPAL, E.
1496
ROTH, H.P.
1077, 1765
ROUX, M.
1460
ROVELSTAD, R.A.
1415
ROWE, R.J.
1614*
ROY, C.C.
1333
ROZENSHTRAUKH, L.S.
1287
RUBIN, E.
1069
RUBIO, C.
1505
RUCAREANU, I.
1512
RUCCI, F.S.
1105
RUDENKO, L.G.
1120
RUDENSKAIA, M.V.
1150
RULE, A.H.
1527*
RUMPF, P.
1703
RUNCAN, V.
1512
RUPPERT, R.D.
1726*
RYAN, J.M.
1932
RYAN, J.N.
928, 1114
RYTKONEN, U.
1498
SACERDOTE, A.
1216
SACHS, F.
1262
SACHS, G.
996*
SADANANDAM, T.V.
1593
SADOWSKY, N.L.
1222
SAHA, S.
1674*, 1951*
SAHA, S.P.
1591
SAITO, N.
1182
SAKELLARIADIS, P.
1469*

SALAM, A.
1629
SALE, J.K.
1233
SALES, J.F.L.
1385*
SALMI, H.J.
1450
SALO, M.
1545
SALSBUREY, D.
910*
SALUPERE, V.
1362
SAMOKHIN, N.A.
1428
SAMUEL, A.M.
1506
SAN DIEGO, A.G.
1555
SANCHEZ, A.
942
SANCHEZ, R.E.
1885*
SANDERS, I.
1458
SANDERS, M.G.
1749
SANDERS, R.C.
1236
SANDERS, S.S.
961
SANDLER, M.
1580
SANNA, N.
1709
SANTOS, U.M.
1808
SANZ JIMENEZ, M.
1242
SAPIA, O.
1106
SARANGEE, R.K.
1048
SARATCHANDRA, R.
1847
SARAYA, A.K.
1434
SARIN, G.S.
1513
SARKAR, S.K.
1959
SARKER, S.L.
1382
SARPHIE, T.G.
1052*
SAUNDERS, R.N.
1172*
SAUNDERS, S.J.
1073, 1149, 1410, 1875
SAVARY, M.
1311
SAWYERS, J.L.
1365
SCHACHTER, H.
1619
SCHAEFFER, A.
1215, 1852
SCHAFER, K.H.
1620
SCHAFER, R.
1557
SCHAFFNER, F.
1773
SCHAPIRO, H.
1175
SCHARF, R.
1010
SCHAUB, J.
1127
SCHEININ, T.M.
1448
SCHENK, E.A.
1505
SCHENKER, S.
1051*
SCHENKMAN, J.B.
1146
SCHENZER, R.
1697
SCHERSTEN, T.
1952
SCHILDT, B.E.
1180
SCHIMKE, R.N.
1346*
SCHISTAD, G.
1706
SCHJONSBY, H.
947*, 948*, 1154*
SCHLAEGER, R.
1697
SCHLEGEL, J.F.
949*
SCHLIENGER, J.L.
1842
SCHMARSOW, R.
1270
SCHMAUSS, A.K.
1853
SCHMID, R.
909*
SCHMIDT, H.A.
1013, 1271
SCHNEEWEISS, B.
1775
SCHNEIDER, C.
1241
SCHNEIDERBAUR, A.
1844
SCHOBER, A.
1777
SCHOENFIELD, L.J.
1797*
SCHOFIELD, G.C.
933
SCHOLLER, J.
1607
SCHOLZ, E.
1736, 1874
SCHOLZ, H.
1776
SCHOLZ, N.E.
975*
SCHOLZ, O.
1874
SCHON, R.
1873
SCHOPEN, R.D.
1471, 1794*
SCHORTGEN, G.
1565
SCHOWENGERDT, C.G.
1683
SCHREIBER, J.
1816
SCHRYVER, H.F.
956
SCHULTE, W.J.
1562
SCHULTHEISS, H.R.
1248*
SCHUSSHEIM, A.
1474
SCHUSTER, G.
1414
SCHWARZBART, G.
1572
SCHWARZE, R.
1558, 1727*
SCHWOB, D.
1503
SCOTT, P.R.
1394*
SCOTT, R.M.
941
SCOTT, V.F.
1077
SCOURAS, C.
1372
SCRATCHERD, T.
1033*
SEAH, C.S.
1289
SEAKINS, A.
1072
SEAL, N.C.
1382
SEAMAN, W.B.
990, 1577
SEAWRIGHT, A.A.
923
SEELIG, H.P.
1020
SEGERSTROM, A.
988
SEHGAL, V.N.
1748
SEIDEL, D.
1715
SEIFERT, E.
1243, 1368
SEIFERT, G.
1665
SEIKRIT, H.
1337
SEKI, T.
1162
SELIVANOV, A.A.
1120
SEMB, L.S.
1012
SETH, S.
1523*

SEYSS, R.
1451
SEZAKI, H.
944*
SEFRCO, A.G.
1315
SHAFFER, R.D.
1783
SHAH, H.H.
1935
SHAH, P.R.
1825
SHAHEEN, M.H.
1724
SHAKHNAZAROV, A.M.
1542
SHALIMOV, A.A.
1647
SHAMRAI, E.F.
1089
SHANBOUR, L.L.
994*, 1891
SHANNON, B.M.
1140
SHARAFISLAMOV, F.SH.
1659
SHAW, D.G.
1455
SHEPHERD, J.
1921
SHEPHERD, R.
1887*
SHER, M.H.
1585
SHERBON, K.J.
1586
SHERLOCK, P.
1895, 1933
SHERLOCK, S.
1755*
SHERR, H.P.
1294*
SHERRATT, H.S.A.
966
SHIMKIN, P.M.
1880, 1894
SHIMOYAMA, M.
1156*
SHINDO, K.
1540
SHINER, M.
1488*
SHOFMAN, D.W.
1743
SHORTER, R.G.
1616*
SHOWALTER, P.J.
974*
SHRADER, R.E.
953
SHWACHMAN, H.
1514, 1627*
SIBIRIAKOVA, G.I.
937
SIDOROV, J.J.
1487*
SIEMSEN, J.K.
1195*
SIGDESTAD, C.P.
941
SILVER, M.
1143
SIMAN, B.
1035*
SIMEK, I.
1944
SIMLER, M.
1215
SIMMONS, D.H.
1066*
SIMMONS, F.
1845*
SIMON, C.
1711
SIMON, M.
1694
SIMPKINS, H.
917*
SIMSON, P.
950*
SINGH, K.N.
1433
SINGH, S.
1556
SINGH, S.A.
1951*
SINGH, S.A.K.
1674*
SINHA, B.N.
939
SINHA, S.N.
1539
SIRCUS, W.
1518*
SIROIS, J.
1587
SITAVANC, L.
1559
SIURALA, M.
1402
SIVALINGAM, S.
1957
SIVALINGHAM, S.
1958
SIVULA, A.
1450
SJODIN, L.
1023, 1024
SKJOLDBORG, H.
1421
SKULBERG, A.
1706
SLAKEY, L.L.
1129
SMALL, D.M.
1848
SMETANA, K.
1704
SMETS, P.
1145
SMITH, E.B.
1350
SMITH, E.C.
1738*
SMITH, H.
1282
SMITH, J.H.
1953
SMITH, M.G.M.
1796*
SMITH, S.L.
1528
SMITH, V.L.
1247
SMITH, W.D.
1540
SOBEL, H.J.
1740*
SOBERMAN, R.
1739*
SODHI, H.S.
1929
SODOMANN, C.P.
1795*
SOHN, T.J.
1377
SOLEIA, E.
1639
SOLING, H.D.
1044
SOLOMON, A.
1931
SOLOMON, T.E.
1037*
SOLOWAY, M.S.
1880
SOLOWAY, R.D.
1797*
SOLTOFT, J.
1480
SOMAN, C.R.
1672
SONGSANAND, P.
1865
SORBY, W.A.
1250
SORENSEN, F.H.
1421
SORRELL, M.F.
1277
SOUCISSE, L.
1333
SOULE, J.C.
1852
SOURCE, G.
930
SOVENY, C.
1390*, 1417
SPAHN, U.
1782
SPANO, C.
1803
SPARKS, H.A.
1953
SPENCE, L.
1786
SPIRA, W.M.
1159
SPOOF, M.
1402
SPRAYREGEN, S.
1879
SRIMANNARAYANA, A.
1523*

SRIVASTAVA, R.D.
1433
SRIVASTAVA, S.K.
1347
STADELMANN, O.
1016
STADIL, F.
1001*, 1387*
STAHL, J.
1842
STAHLGREN, L.H.
1436
STAHMANN, F.D.
1534
STALDER, G.A.
1248*, 1272
STANILAND, J.R.
1922
STAUDACHER, V.
1833
STAVROPOULOS, A.K.
1791
STEELE, W.J.
922
STEFANINI, P.
1862
STEINBACH, H.L.
1230
STENGER, R.J.
1118
STEVENS, C.E.
983
STEVENS, D.P.
1765
STEVENSON, R.E.
1312
STIEHL, A.
1676*
STOCKEN, L.A.
1131
STOECKEL.
1215
STOENESCU, V.
1730
STOKER, T.A.M.
1930
STOKKE, K.T.
1110, 1124
STOLTE, F.
1956
STOLTE, J.B.
1956
STOLZENBERG, J.
1700
STRADLEY, R.P.
1644
STRAHNZ, K.
1771
STRASBERG, Z.
1664
STRAUS, F.
1527*
STRICKLAND, R.G.
1340*
STRITTMATTER, C.F.
1136
STROHMEYER, G.
1795*
STROMBECK, D.R.
967
STROTGES, M.W.
1254
STRUDER, P.
1554
STUART, D.W.
1336
STUBER, J.L.
1189*
STUTMAN, L.J.
1764*
SUKHININ, V.I.
1120
SUKI, W.N.
1788
SULLIVAN, B.H., JR.
1280
SUMMERSKILL, W.H.J.
1797*
SURIANO, J.R.
1787
SUTHERLAND, W.H.
1648
SUTOR, D.J.
1882
SVANE, S.
1630
SVENNERHOLM, L.
1106
SWADER, J.I.
1194*
SWAN, K.G.
1923
SWARUP, B.
939
SWEETLAND, C.A.
1218
SWENDSEID, M.E.
942
SWYNNERTON, B.F.
1388*
SYMBAS, P.N.
1310
SYRNIKOV, N.G.
1404
SZCZEPANSKI, M.
1328
TABAQCHALI, S.
1384*
TACKE, A.
1775
TAENZER, V.
1453
TAKAHASHI, Y.
1094
TAKAHATA, J.
1491
TAKETA, K.
1095
TAKEZAWA, K.
1137
TALAMO, R.
1344*
TAN, I.K.
1246
TANEJA, O.P.
1963
TANGHE, W.
1605
TANIGAWA, Y.
1156*
TANNER, N.C.
1388*
TANSY, M.F.
982*
TAPPEINER, G.
1173*
TASHJIAN, A.H., JR.
1075
TASHKIN, D.P.
1066*
TAUBERT, M.
1723
TAUBERT, W.
1244
TAY, S.
917*
TAYLOR, E.A.
1070
TAYLOR, L.L.
1294*
TAYLOR, P.A.
1206
TEDESCHI, L.G.
1585
TEMPLETON, A.W.
1189*
TEN BENSEL, R.W.
1947
TENENHOUSE, A.
1034*
TERASHI, S.
1148
TERBLANCHE, J.
1073, 1149, 1410, 1875
TERES, J.
1799
TERSIGNI, R.
1658
TESTAS.
1190*
TEWS, J.K.
1080
THALER, H.
1374
THALER, M.M.
1676*
THAYSEN, E.H.
1408
THERRIAULT, D.G.
1092
THIELE, H.G.
1015
THIELMANN, K.
1285
THIESSEN, H.
1729
THOMAS, E.
1281
THOMAS, F.B.
910*, 1313
THOMAS, J.
1887*
THOMAS, J.A.
1353

NUMBERS FOLLOWED BY AN ASTERISK INDICATE ABSTRACTS. OTHER NUMBERS REFER TO CITATIONS.

THOMAS, L.
1035*
THOMAS, W., JR.
1738*
THOMPSON, J.C.
999*, 1003
THOMPSON, J.R.
1458
THOMSON, F.B.
1552
THOMSSEN, R.
1777
THOR, P.
995*
THOUVENOT, J.
1548
TICHET, J.
1709
TIERRIS, E.
1372
TILLACK, T.W.
1526*
TIN, V.P.
1663
TINKER, J.
1384*
TIULA, E.
1760*
TOBIN, R.B.
1115
TOCCALINO, H.
1202
TOLENTINO, W.
1350
TOLINS, S.H.
1425
TOLNAI, G.
1587
TOMASINI, J.T.
1505
TOMASZEWSKI, L.
1447
TONDON, B.N.
1434
TONDREAU, R.L.
1531
TOSI, P.
930
TOTH, I.
1119
TOURNIER, G.
1309
TOWEY, R.M.
1206
TOWLER, W.F.
1516*
TRACY, G.D.
1932
TRANBERG, K.G.
951
TRAVIS, J.
1046
TREGUBOV, N.
1232
TREJO, R.
1076
TRIER, J.S.
912*, 1510
TRIGAUX, J.P.
1152
TROTOUX, J.
1330
TROTT, M.
986
TROUILLET, G.
1565
TROUNIN, M.A.
1673
TRUEBLOOD, H.W.
1598
TRUELOVE, S.C.
1521*
TSIREL'NIKOV, N.I.
937
TSUZUKI, T.
1314
TUDOR, R.W.
1966
TUREVSKII, A.A.
924
TURNER, D.M.
1171*
TURNER, M.D.
1503
TUSZEWSKI, F.K.
1316
TUTTON, R.H.
1528
TYAGI, S.P.
1748
TYGSTRUP, N.
1716
TYRAS, D.H.
1310
UEDA, I.
1156*
UEDA, M.
1314
UFER, C.
1273
UMEZAWA, C.
942
UNBEHAUN, G.
1747
UNGER, K.O.
1044
UYS, C.J.
1410
VAAGE, S.
1342*
VAGN NIELSEN, O.
1544
VALENKEVICH, L.N.
1770
VALLET, H.L.
1507
VAN BADEN, M.
1607
VAN GORP, L.H.M.
1790
VAN HOREBEEK, R.
1364
VAN LESSEN,
1719
VAN LESSEN, H.
1719
VAN NUETEN, J.M.
992
VAN ROSSUM, W.
1607
VAN SOESBERGEN, R.M.
1641
VANDEVOORDE, J.
1527*
VANKEMMEL, M.
1424, 1671
VANSANT, J.H.
1319
VARA TORBECK, C.
1649
VARIS, K.
1402
VASIL'EV, IU.V.
1288
VASIL'EVA, E.N.
1133
VASILESCU, F.
1512
VASSALLO, G.
1639
VATIER, J.
1883*
VEENEMA, R.
1532
VEITH, F.J.
1739*
VEJLSTED, H.
1652*
VELTRONI, A.
1326
VENKAIAH, K.R.
1224
VENKATESAN, N.
922
VENKATESAN, S.R.
1295
VERDIELL, J.
1693
VERME, G.
1803
VERNON, M.
1218
VERTOMMEN, A.
1607
VEYRAC, Y.
1204
VIGNE, J.L.
1081
VIGORITO, F.
1229
VINCE, A.
1470*
VINCENTI, R.
1658
VISCHER, T.L.
1800
VISFELDT, J.
1690
VISKUM, K.
1941
VITKIN, B.S.
1301
VITKO, R.J.
970

VLASOV, P.V.
1363
VOGEL, T.T.
1373
VOLKHEIMER, G.
972
VOLOSEVICH, G.A.
1663
VOLOSEVICH, N.V.
1663
VOLPARI, B.
1829
VON MIKULICZ-RADECKI, J.G.
1914
VOS, A.
1870
VYNCKE, G.
1339
WAGER, G.
954
WAGGONER, J.G.
1725*
WAGNER, A.
1479
WAGNER, H.
1624
WAGNER, M.
1718
WALAN, A.
1631
WALKER, A.C.
1492
WALKER, J.
1765
WALKER-SMITH, J.A.
1444
WALLACE, C.K.
1153*
WALLACH, S.
960
WALLER, S.L.
1942
WALLS, W.D.
1322
WALSCHAW, R.
932
WALSHE, J.M.
1678*
WANG, C.A.
1344*
WANG, T.K.
1587
WANGSNESS, P.J.
962
WANSTRUP, J.
1481
WAPNICK, S.
1308
WARCHOL, J.B.
1752
WARD, J.T.
1420
WARREN, W.D.
1629
WARSHAW, A.L.
1185
WATANABE, A.
1095
WATANABE, H.
1314
WATANABE, K.
1148
WATANABE, K.S.
1598
WATERHOUSE, J.A.
1467*
WATERLOW, J.C.
1072
WATKINS, M.L.
1130
WATTIAUX, R.
1152
WATTS, J.A.E.
1580
WAXMAN, A.D.
1195*
WAY, L.W.
1846*
WEBER, L.
1624
WEBSTER, P.D.
1042, 1043, 1900
WEENS, H.S.
1628
WEIL-BOUSSON, M.
1215
WEIL, J.P.
1215, 1329
WEISS, B.
1695
WEISS, H.D.
1196*
WEISS, M.C.
1141
WELCH, J.P.
1864
WELLER, M.H.
1331
WELLS, P.N.T.
1227, 1228
WENDT, F.
1355
WENZEL, R.P.
1766
WERNER, H.
1853
WERNER, U.
1853
WESER, E.
1158*
WESTCOTT, J.L.
1543
WESTERFELD, W.W.
1121, 1122
WHELTON, M.J.
1804
WHITE, T.T.
1038
WHITEHEAD, R.
1445
WHITFIELD, J.F.
1059*
WHITTAKER, G.E.
1025
WHITTON, P.D.
1070
WICHT, S.
1073
WIECHERT, E.
1754
WIEGAND, U.
1775
WIENBECK, M.
1291*
WIERNIK, G.
1566
WIESNER, W.
1196*
WILCOX, F.H.
1087
WILDGRUBE, J.
1816
WILEY, J.H.
1079
WILHELMI, U.
1261
WILLIAMS, C.N.
1487*
WILLIAMS, J.A.
1596
WILLIAMS, R.
1580, 1796*, 1840
WILLIAMSON, D.H.
1802
WILSON, E.R.
1052*
WILSON, M.A.
927
WINAWER, S.J.
1895
WINSHIP, D.H.
1783
WIRTHLIN, L.S.
1403
WITZEL, L.
1369
WNOROWSKA, B.
1769
WOLF, E.H.
1740*
WOLF, R.O.
1294*
WOLFF, G.
1354
WOLFF, M.
1469*
WOLGEMUTH, R.
1644
WOLLGENS, P.
1453
WOLLOCH, Y.
1622
WOLMA, F.J.
1662
WOLOWICKA, L.
1752
WOMACK, N.A.
1416
WOODARD, J.C.
1900
WOODCOCK, N.A.
1080
WOOLER, G.H.
1293*

WORMSLEY, K.G.
1041, 1233, 1395*
WREFORD, N.G.M.
933
WRIGHT, H.K.
1881
WRIGHT, R.
1802
WRONG, O.M.
945*
WURBS, D.
1273
WYNN WILLIAMS, A.
916*
YAKOVAC, W.C.
1507
YAMAMOTO, K.
1198
YAMAMURA, Y.
1094
YANG, S.S.
1682
YASUNOTO, K.
957
YEH, B.K.
1822*
YEO, B.W.
1250
YEUNG, C.Y.
1734
YOKOO, H.
1813
YOKOYAMA, S.
1082
YOUNG, D.G.
1299
YOUNGS, G.
1635
YOUNGS, G.R.
1214, 1473
ZAKHAROVA, G.N.
1428
ZALEWSKI, H.
1371
ZAMCHECK, N.
1934
ZANAMWE, L.N.D.
1308
ZANANDREA, B.
1808
ZANELLA, E.
1431*
ZANKL, I.
1754
ZANOTTI, W.M.
1808
ZARDAY, R.
1739*
ZEDERFELDT, B.
1631
ZEMAN, F.J.
953
ZER, M.
1622
ZERON MEDINA, E.
1714
ZERON MEDINA, F.
1714
ZILLY, W.
1778
ZIMMERMAN, H.J.
1119
ZINNEMAN, H.H.
1949*
ZISSIADIS, A.C.
1602
ZUFAROV, K.A.
1161
ZUIDEMA, G.D.
1655
ZUKOSKI, C.F.
1114
ZWIRNER, R.
1843
ZYTKIEWICZ, B.
1962

- ABDOMEN
  - ABSCESS
    - CROHNS DISEASE, 1584
  - ACUTE
    - DIAGNOSIS, 1919, 1920, 1921, 1922
    - DISEASES ASSOCIATED WITH, 1899
    - RADIOLOGY, 1918
    - SURGERY, 1920, 1921
  - DIAGNOSIS
    - ANGIOGRAPHY, 1213, 1240
    - RADIOLOGY, 1242

- ABORTION
  - LIVER
    - MORPHOLOGY, 937

- ABSCESS
  - ABDOMEN
    - CROHNS DISEASE, 1584
  - APPENDIX, 1575
  - ESOPHAGUS
    - ETIOLOGY, 1338
    - FOREIGN BODIES, 1338
    - SURVIVAL, 1338
  - LIVER, 1687
    - AMEBIASIS, 1968
    - BACTERIA, 1746
    - COMPLICATIONS, 1968
    - ECHINOCOCCOSIS, 1952
    - FUNGUS INFECTION, 1750
    - RADIOLOGY, 1236
    - SALMONELLOSIS, 1749
    - SCANNING, SCINTILLATION, 1236
    - SEX FACTORS, 1968
  - PANCREAS
    - DIAGNOSIS, 1190*
    - SALMONELLOSIS, 1670

- ABSORPTION
  - COLON
    - AMMONIA, 945*
  - COMPUTER
    - TECHNIQUES, 962
  - FAMILIAL FACTORS
    - PROTEIN DEFICIENCY, 953
  - GALACTOSE
    - DIABETES, 952
  - IRON
    - PANCREATITIS, 1672
  - JEJUNUM
    - AMINO ACIDS, 968
    - GLUCOSE, 968
  - LARGE INTESTINE, 972
    - PHOSPHORUS, 956
    - URINE, 970
  - LIVER
    - TRIGLYCERIDES, 915*
  - PEPTIDE
    - MALABSORPTION, 1515
  - PROTEIN
    - EMBRYOLOGY, 946*
    - NEONATE, 955
  - SMALL INTESTINE, 972
    - AMINO ACIDS, 950*
    - BILE ACIDS, 944*
    - CHOLECYSTOKININ, 965
    - CHOLERA, 967
    - DRUGS, 944*
    - EMBRYOLOGY, 946*
    - ENZYMES, 1156*
    - GALACTOSE, 952
    - GLUCOSE, 951, 962
    - IRON, 910*
    - LACTOSE, 1450
    - NEONATE, 953
    - PEPTIDES, 950*
    - PROTEIN, 955
    - SUGAR, 965
    - TECHNIQUES, 951, 962, 964
    - TRIGLYCERIDES, 915*
    - URINE, 970
    - VITAMIN B12, 947*, 948*, 959
    - VITAMIN E, 943*
    - WATER, 952
  - STOMACH, 972
    - ALCHOHOL, 1000*
    - CHOLINE, 1000*
  - SURGERY
    - SMALL INTESTINE, 959
  - VITAMIN B2
    - BACTERIA, 948*
  - VITAMIN B12
    - BACTERIA, 947*

- ACETYLCHOLINE
  - LIVER
    - CIRCULATION, 920
  - PANCREAS
    - BIOPOTENTIALS, 1036*

- ACHALASIA
  - DIAGNOSIS
    - PRESSURE STUDIES, 1328
    - RADIOLOGY, 1328
  - ESOPHAGUS
    - DILATATION, 1291*
    - MOTILITY, 1291*

- ACHLORHYDRIA
  - SEE ALSO ACID SECRETION

- ACID PHOSPHATASE
  - SEE PHOSPHATASE, ACID

- ACID SECRETION
  - SEE ALSO ACHLORHYDRIA
  - SEE ALSO HYPERCHLORHYDRIA
  - SEE ALSO HYPOCHLORHYDRIA
  - PEPTIC ULCER
    - HORMONE CONTROL, 999*
    - PENTAGASTRIN, 998*
    - VAGOTOMY, 997*
  - STOMACH, 1344*
    - ADRENERGIC AGENTS, 1004
    - ADRENERGIC BLOCKING AGENTS, 1004
    - ANTRECTOMY, 1010
    - CALCIUM, 1029, 1344*
    - CHOLINERGIC AGENTS, 1398
    - CIRCADIAN RHYTHM, 1341*
    - CYCLIC ADENOSINE MONOPHOSPHATE, 1011
    - 2-DEOXY-D-GLUCOSE, 1248
    - DIAGNOSIS, 1271
    - DIETARY FACTORS, 1007, 1019
    - ENDOCRINE SYSTEM, 1030
    - GASTRIN, 1344*, 1394*
    - GASTRITIS, 1391*
    - GLUCAGON, 1017

- HISTAMINE, 1012
- HORMONE CONTROL, 1029
- HORMONES, 995*, 1006, 1023, 1025, 1026, 1030
- HYPOGLYCEMIA, 1018, 1019, 1031
- INSULIN, 1031, 1245, 1248
- NERVOUS CONTROL, 997*, 1018, 1024, 1248
- PENTAGASTRIN, 1128, 1393*
- PEPTIC ULCER, 1389*, 1391*
- SECRETIN, 1040
- SECRETION, 1016
- STRESS, 1385*
- TECHNIQUES, 1026, 1028, 1265, 1273
- ULCER, DUODENUM, 1393*, 1430
- ULCER, STOMACH, 1430
- VAGOTOMY, 1009, 1400

STOMACH DISEASE
- REFLUX, 1027

ULCER, DUODENUM
- SURGERY, 1398
- VAGOTOMY, 1393*

ZOLLINGER-ELLISON SYNDROME, 1885*
- HORMONE CONTROL, 999*

CIDITY
- FECES, 945*

CIDOSIS
- CARBOHYDRATE
  - METABOLISM, 1066*

CUTE
- ABDOMEN
  - DIAGNOSIS, 1919, 1920, 1921, 1922
  - DISEASES ASSOCIATED WITH, 1899
  - RADIOLOGY, 1918
  - SURGERY, 1920, 1921

DENOSINE TRIPHOSPHATASE
- PANCREAS, 1035*
- SMALL INTESTINE
  - MORPHOLOGY, 1161

DHESIONS
- CECUM
  - PERITONEUM, 1523*

DHESIVES
- SEE TISSUE ADHESIVES

DOLESCENTS
- APPENDECTOMY
  - COMPLICATIONS, 1546
- ESOPHAGUS
  - DIVERTICULUM, 1305
- STOMACH
  - NEOPLASMS, BENIGN, 1351

DRENERGIC AGENTS
- STOMACH
  - ACID SECRETION, 1004

DRENERGIC BLOCKING AGENTS
- STOMACH
  - ACID SECRETION, 1004

GE FACTORS
- SEE ALSO CHILDREN, NEONATE
- DUODENUM
  - PHOSPHATASE, 1136
- HIRSCHSPRUNGS DISEASE, 1597
- LARGE INTESTINE
  - NEOPLASMS, MALIGNANT, 1581
- LIVER
  - AMINO ACIDS, 1055*
  - ENZYMES, 1111, 1181
  - GLUCONEOGENESIS, 1127
  - GLYCOLYSIS, 1127
  - PHOSPHATASE, 1136
  - PROTEIN, 1055*
  - REGENERATION, 1082
- MORTALITY
  - BLEEDING, 1948
- STOMACH
  - MORPHOLOGY, 934
  - NEOPLASMS, MALIGNANT, 1369
- ULCERATIVE COLITIS, 1614*

ALCOHOL
- LIVER
  - ENZYMES, 1060*
  - METABOLISM, 1069
- METABOLISM, 1807
  - CARBOHYDRATE, 1815
  - DIET THERAPY, 1815
  - MITOCHONDRIA, 1069
- PANCREATITIS
  - EPIDEMIOLOGY, 1665
  - ETIOLOGY, 1661

ALCOHOL DEHYDROGENASE
- LIVER
  - NEOPLASMS, MALIGNANT, 1141

ALCOHOLIC LIVER DISEASE
- SEE LIVER DISEASE, ALCOHOLIC

ALKALINE PHOSPHATASE
- SEE PHOSPHATASE, ALKALINE

ALKALOIDS
- LIVER
  - METABOLISM, 1093

ALKALOSIS
- CARBOHYDRATE
  - METABOLISM, 1066*
- RECTUM
  - NEOPLASMS, BENIGN, 1565

ALLERGY
- GASTROINTESTINAL
  - DISEASES, 1911
- HEPATITIS, CHRONIC
  - DISEASES ASSOCIATED WITH, 1804

AMEBIASIS
- APPENDICITIS, 1963
- LIVER
  - ABSCESS, 1968
  - DIAGNOSIS, 1960
  - DRUG TREATMENT, 1957
  - EPIDEMIOLOGY, 1958
  - LIVER FUNCTION TESTS, 1957
- PERITONITIS, 1963

AMINO ACIDS

NUMBERS FOLLOWED BY AN ASTERISK INDICATE ABSTRACTS. OTHER NUMBERS REFER TO CITATIONS.

- ABSORPTION
  - JEJUNUM, 968
  - LIVER
    - AGE FACTORS, 1055*
    - CHEMICAL COMPOSITION, 1140
    - DIETARY FACTORS, 942
    - ENZYMES, 1140
    - GLUCONEOGENESIS, 1137
    - METABOLISM, 1080, 1137
    - REGENERATION, 1131
  - MALABSORPTION, 1515
  - METABOLISM
    - LARGE INTESTINE, 1165
    - LIVER, 1055*, 1064*, 1067*
    - PROTEIN DEFICIENCY, 1072
  - PANCREAS
    - SECRETION, 1045
  - SMALL INTESTINE
    - ABSORPTION, 950*
  - SYNTHESIS
    - LIVER, 1064*
  - TRANSPORT
    - SMALL INTESTINE, 957

- AMMONIA
  - COLON
    - ABSORPTION, 945*

- AMPULLA OF VATER
  - DUODENUM
    - DIVERTICULUM, 1452

- AMYLASE
  - BLOOD
    - PANCREATITIS, 1657, 1663
  - LIVER
    - DIETARY FACTORS, 1091
  - LYMPH
    - PANCREATITIS, 1659
  - PANCREAS
    - SECRETION, 1032*, 1039, 1044
  - PANCREAS DISEASE
    - DIAGNOSIS, 1269
  - PANCREATITIS
    - DIAGNOSIS, 1294*
  - SALIVARY GLANDS
    - SECRETION, 1032*

- AMYLOIDOSIS
  - LARGE INTESTINE, 1904
  - LIVER
    - ETIOLOGY, 1898
    - SIMULATION, 1898
    - ULTRASTRUCTURE, 1898
  - SMALL INTESTINE, 1904

- ANATOMY
  - LIVER
    - ANOMALY, CONGENITAL, 1681

- ANEMIA
  - DISEASES ASSOCIATED WITH
    - MALABSORPTION, 1434
  - KWASHIORKOR
    - ETIOLOGY, 1946

- ANEMIA, PERNICIOUS
  - DISEASES ASSOCIATED WITH
    - NEOPLASMS, MALIGNANT, 1343*
  - GASTRECTOMY
    - DISEASES ASSOCIATED WITH, 1163
  - IMMUNOLOGY, 1015
  - SECRETION
    - CHEMICAL COMPOSITION, 1883*
  - THERAPY
    - VITAMIN B12, 1163

- ANESTHESIA
  - HEMMORHOIDS, 1596
  - PANCREAS
    - METABOLISM, 1047
  - PEPTIC ULCER
    - ETIOLOGY, 1429

- ANESTHETICS
  - LIVER
    - INJURY, 1118
    - METABOLISM, 1145

- ANEURYSM
  - LIVER
    - BLEEDING, 1700
  - RUPTURE
    - PANCREAS, 1636

- ANGIOGRAPHY
  - ABDOMEN
    - DIAGNOSIS, 1213, 1240
  - BILE DUCT
    - ANOMALIES, 1223
    - DIAGNOSIS, 1223
  - BILIARY TRACT
    - COMPLICATIONS, 1221, 1250
    - DIAGNOSIS, 1221, 1235
  - CHOLEDOCHOLITHIASIS, 1846*
  - COLITIS
    - ISCHEMIA, 1543
  - DUODENUM
    - DIAGNOSIS, 1267
  - GALLBLADDER
    - NEOPLASMS, MALIGNANT, 1879
  - GASTROINTESTINAL
    - BLEEDING, 1937, 1944
    - DISEASE, 1213
  - JAUNDICE
    - DIAGNOSIS, 1250
  - JAUNDICE, OBSTRUCTIVE
    - DIAGNOSIS, 1250
  - LIVER
    - CIRCULATION, 1183
    - METASTASES, 1287
    - MORPHOLOGY, 1183
    - REGENERATION, 1084
  - PANCREAS DISEASE
    - DIAGNOSIS, 1241, 1270

- ANOMALIES, CONGENITAL
  - ANORECTUM
    - EMBRYOLOGY, 1553

- ANOMALY
  - APPENDIX, 1573
  - COLON
    - MORPHOLOGY, 1578
  - DIGESTION
    - DRUG-INDUCED, 1927
  - GASTROINTESTINAL
    - CONGENITAL, 1960

        DISEASES ASSOCIATED WITH, 1915
        DOWNS SYNDROME, 1947
        DRUG-INDUCED, 1927
    STOMACH
        DIAGNOSIS, 1377
        MORPHOLOGY, 1377

ANOMALY, CONGENITAL
    ANUS, 1556
    BILE DUCT, 1858
    BILIARY TRACT
        DISEASES ASSOCIATED WITH, 1873
    COLON
        SURGERY, 1324
    DUODENUM, 1855
    ESOPHAGUS
        SURGERY, 1324
    GALLBLADDER, 1855
    INTESTINE
        LYMPHANGIECTASIA, 1507
    LARGE INTESTINE, 1556
    LIVER
        ANATOMY, 1681
        SURGERY, 1856
    RECTUM
        PRESSURE STUDIES, 1547
    SMALL INTESTINE
        ATRESIA, 1435
        STENOSIS, 1435

ANORECTUM
    ANOMALIES, CONGENITAL
        EMBRYOLOGY, 1553

ANTIBACTERIALS
    DRUG TOXICITY
        HEPATITIS, NONVIRAL, 1745
        LIVER FUNCTION TESTS, 1754
    HEPATITIS, NONVIRAL, 1742
    LIVER
        INJURY, 1721
    MALABSORPTION
        VITAMIN B12, 1498

ANTIBIOTICS
    SEE ALSO ANTIBACTERIALS, DRUG
      TREATMENT
    DIARRHEA
        CHILDREN, 1502
        NEONATE, 1889
    DRUG METABOLISM
        CIRRHOSIS, 1832
    FATTY LIVER
        ETIOLOGY, 1051*
    GAS, INTESTINAL
        DRUG EFFECTS ON, 1936
    LARGE INTESTINE, 1522*
        SURGERY, 1530
    LIVER
        DRUG TOXICITY, 1751
        INJURY, 1705
        SECRETION, 1051*
        TUBERCULOSIS, 1741

ANTIBODIES
    ANTIGEN, AUSTRALIA
        HEPATITIS, VIRAL, 1792
    CIRRHOSIS
        CIRCULATION, 1834
        ETIOLOGY, 1677*
    IMMUNOGLOBULINS
        CIRRHOSIS, 1800
        HEPATITIS, CHRONIC, 1800
    LIVER
        MICROSCOPY, 1677*

ANTICHOLINERGIC AGENTS
    HYPERCHLORHYDRIA
        DRUG TREATMENT, 1382
    PEPTIC ULCER
        DRUG TREATMENT, 1392*
        RECURRENCE, 1392*

ANTICOAGULANTS
    LIVER
        DRUG METABOLISM, 1098

ANTIENZYME
    DEFICIENCY
        CIRRHOSIS, 1675*

ANTIENZYMES
    PANCREATITIS
        THERAPY, 1659

ANTIGEN
    GASTROINTESTINAL
        NEOPLASMS, MALIGNANT, 1886*, 1945

ANTIGEN, AUSTRALIA
    ANTIBODIES
        HEPATITIS, VIRAL, 1792
    CHEMICAL COMPOSITION, 1787
    HEPATITIS
        REVIEWS, 1785
    HEPATITIS, CHRONIC
        EPIDEMIOLOGY, 1803
    HEPATITIS, SERUM
        IMMUNOLOGY, 1777
    HEPATITIS, VIRAL
        DIAGNOSIS, 1282
        EPIDEMIOLOGY, 1211, 1768
        ETIOLOGY, 1764*
        IMMUNOLOGY, 1755*, 1758*, 1759*,
          1790
    HEPATITIS, VIRUS
        TECHNIQUES, 1262
    IMMUNOLOGY
        MICROSCOPY, 1773
    LIVER
        MICROSCOPY, 1786
    LIVER DISEASE, 1799
        DIAGNOSIS, 1217
    MICROSCOPY, 1787
        CIRRHOSIS, 1762*
        HEPATITIS, CHRONIC, 1762*
        HEPATITIS, VIRAL, 1762*
    TECHNIQUES, 1212

ANTIHORMONES
    HEPATOMEGALY
        ETIOLOGY, 1115
    LIVER
        CHEMICAL COMPOSITION, 1115
        ULTRASTRUCTURE, 1115

ANTRECTOMY
    SEE ALSO GASTRECTOMY

- SEE ALSO STOMACH, SURGERY
- STOMACH
    - ACID SECRETION, 1010

ANTRUM
- SEE ALSO STOMACH

ANUS
- SEE ALSO LARGE INTESTINE
- ANOMALY, CONGENITAL, 1556
- FISSURE
    - SURGERY, 1602
- INCONTINENCE
    - SURGERY, 1538
- NEOPLASMS, BENIGN, 1539
- SPHINCTER
    - DIAGNOSIS, 1251

APPENDECTOMY
- COMPLICATIONS
    - ADOLESCENTS, 1546
    - CHILDREN, 1546

APPENDICITIS
- AMEBIASIS, 1963
- DIAGNOSIS, 1264
- DISEASES ASSOCIATED WITH
    - CIRCULATION, 1567

APPENDIX
- SEE ALSO LARGE INTESTINE
- ABSCESS, 1575
- ANOMALY, 1573
- CROHNS DISEASE, 1587
- DIVERTICULUM, 1606
- ENDOMETROSIS, 1520*
- MORPHOLOGY
    - CYSTIC FIBROSIS, 1627*
- PERFORATION
    - COMPLICATIONS, 1575
- VOLVULUS, 1560

ARSENIC
- CIRRHOSIS
    - ETIOLOGY, 1836

ASCARIASIS
- GASTROINTESTINAL
    - MORPHOLOGY, 1955
    - ULCERS, 1955

ASCITES
- CIRRHOSIS
    - DIURETICS, 1842
- PANCREAS
    - CALCULI, 1646
- PANCREATITIS, 1646

ASPIRIN
- METABOLISM
    - SEX FACTORS, 1910

ATRESIA
- BILIARY TRACT
    - DISEASES ASSOCIATED WITH, 1839
    - SURGERY, 1841
- ESOPHAGUS
    - DISEASES ASSOCIATED WITH, 1312
    - REVIEWS, 1299
- SMALL INTESTINE
    - ANOMALY, CONGENITAL, 1435

AUTORADIOGRAPHY
- STOMACH
    - MORPHOLOGY, 931
- TRANSPORT
    - SMALL INTESTINE, 963

BACTERIA
- ABSORPTION
    - VITAMIN B2, 948*
    - VITAMIN B12, 947*
- DIARRHEA
    - DIAGNOSIS, 1902
    - ETIOLOGY, 1902, 1935
- GASTROENTERITIS
    - ETIOLOGY, 1177
- LIVER
    - ABSCESS, 1746
- SMALL INTESTINE
    - VITAMIN B12, 1154*

BEZOARS
- SEE FOREIGN BODIES

BICARBONATE
- PANCREAS
    - DIAGNOSIS, 1281
    - SECRETION, 1040, 1045, 1281

BILE
- CHEMICAL COMPOSITION, 1090
    - CHILDREN, 1083
    - CHOLECYSTECTOMY, 1845*
    - CHOLELITHIASIS, 1848
    - CHOLERETIC AGENTS, 1132
    - DIETARY FACTORS, 1081
- CHOLELITHIASIS
    - CHOLESTEROL, 1845*
- METABOLISM
    - TRANQUILIZERS, 1698
- SECRETION
    - CHOLERETIC AGENTS, 1132, 1147
    - CIRCULATION, 1133
    - ION TRANSPORT, 1147
    - LAXATIVES, 1743
    - MARKER STUDIES, 1184
- STASIS
    - CHOLELITHIASIS, 1077
- TRIGLYCERIDE
    - HORMONE CONTROL, 1130

BILE ACIDS
- CECUM
    - MICROORGANISMS, 1160
- FECES
    - ILEUM DISEASE, 1449
- ILEUM
    - MICROORGANISMS, 1160
- LIVER DISEASE
    - REVIEWS, 1689
- MALABSORPTION
    - REVIEWS, 1854
- METABOLISM
    - CHOLELITHIASIS, 1848
    - CIRRHOSIS, 1819*
    - FATTY LIVER, 1816
    - ILEOSTOMY, 1518*

    - KWASHIORKOR, 1489
    - LIVER DISEASE, 1819*
    - MICROORGANISMS, 1160
    - PROCTOCOLECTOMY, 1518*
  - PHYSICAL PROPERTIES
    - REVIEWS, 1854
  - PRURITUS
    - ETIOLOGY, 1680
  - SMALL INTESTINE
    - ABSORPTION, 944*

- BILE DUCT
  - ANOMALIES
    - ANGIOGRAPHY, 1223
  - ANOMALY, CONGENITAL, 1858
  - DIAGNOSIS
    - ANGIOGRAPHY, 1223
  - NEOPLASMS, MALIGNANT
    - DIAGNOSIS, 1696
    - SURGERY, 1701
  - PROLAPSE, 1851
  - STRICTURE
    - SURGERY, 1861

- BILE SALTS
  - SEE BILE ACIDS

- BILIARY ATRESIA
  - MALABSORPTION
    - VITAMIN E, 1260

- BILIARY OBSTRUCTION
  - DRUG TREATMENT, 1680

- BILIARY TRACT
  - ANGIOGRAPHY
    - COMPLICATIONS, 1221, 1250
  - ANOMALY, CONGENITAL
    - DISEASES ASSOCIATED WITH, 1873
  - ATRESIA
    - DISEASES ASSOCIATED WITH, 1839
    - SURGERY, 1841
  - DIAGNOSIS
    - ANGIOGRAPHY, 1221, 1235
    - RADIOLOGY, 1220
  - FISTULAS, 1852
  - MORPHOLOGY
    - CIRRHOSIS, 1793*
    - HEPATITIS, CHRONIC, 1793*
  - MOTILITY
    - VAGOTOMY, 1869
  - NEOPLASMS
    - SCANNING, SCINTILLATION, 1187*
  - NEOPLASMS, MALIGNANT
    - SURGERY, 1651, 1860, 1875
  - OBSTRUCTION
    - SCANNING, SCINTILLATION, 1266
  - SURGERY, 1856
    - COMPLICATIONS, 1878
    - TECHNIQUES, 1133
  - TRAUMA
    - HEMOBILIA, 1870

- BILIARY TRACT DISEASE
  - DRUG TREATMENT, 1872

- BILIRUBIN, 1071
  - BLOOD
    - NEONATE, 1727*
  - LIVER
    - METABOLISM, 1494
  - METABOLISM
    - DIETARY FACTORS, 1086
    - DRUG EFFECTS ON, 1057*, 1058*
    - FATTY ACIDS, 1729, 1732
    - HORMONE CONTROL, 1054*
    - INTESTINE, 1057*
    - LIVER, 1057*, 1058*, 1138
    - NARCOTICS, 1735
    - SEDATIVES, 1736
  - REVIEWS, 1733
  - TRANSPORT
    - HORMONE CONTROL, 1054*

- BINDING
  - SEE METABOLISM
  - VITAMIN B12
    - HEPATITIS, VIRAL, 1761*

- BIOPSY
  - CIRRHOSIS
    - DIAGNOSIS, 1831
  - DUODENUM
    - TRAUMA, 1440
  - LARGE INTESTINE
    - DIAGNOSIS, 1207
    - NEOPLASMS, MALIGNANT, 1517*
    - POLYPS, 1517*
  - LIVER
    - LIVER DISEASE, ALCOHOLIC, 1808
    - SEDATIVES, 1276
  - LIVER DISEASE
    - DIAGNOSIS, 1226
  - PANCREAS
    - DIAGNOSIS, 1258
  - RECTUM
    - POLYPS, 1583
  - SMALL INTESTINE
    - DIAGNOSIS, 1207
    - TECHNIQUES, 1445
  - STOMACH
    - DIAGNOSIS, 1207, 1271
    - GASTRITIS, 1275
  - WHIPPLES DISEASE
    - DIAGNOSIS, 1437

- BLEEDING
  - COLON
    - DIVERTICULUM, 1525*
  - DIVERTICULUM, MECKELS
    - NEOPLASMS, BENIGN, 1446
  - DUODENUM
    - ULCER, 1409
  - ESOPHAGUS
    - NEOPLASMS, MALIGNANT, 1296
    - THERAPY, 1838
    - VARICES, 1838
  - GASTROINTESTINAL
    - ANGIOGRAPHY, 1937, 1944
    - CHILDREN, 1940
    - DIAGNOSIS, 1939
    - DISEASES ASSOCIATED WITH, 1939
    - DRUG TREATMENT, 1884*
    - ENDOSCOPY, 1204
    - ETIOLOGY, 1938, 1948
    - FAMILIAL FACTORS, 1944
    - MORTALITY, 1939
    - SEPSIS, 1938

    SURVIVAL, 1941
    TREATMENT, 1938
    VASOCONSTRICTORS, 1884*, 1937
  LARGE INTESTINE
    DIVERTICULUM, 1600
  LIVER
    ANEURYSM, 1700
  MORTALITY
    AGE FACTORS, 1948
  PANCREATITIS
    COMPLICATIONS, 1671
  PEPTIC ULCER
    DRUG TREATMENT, 1383*, 1386*, 1428
    PYLOROPLASTY, 1373
    SURGERY, 1386*, 1388*, 1399, 1427, 1428
    SURVIVAL, 1386*, 1399
    THERAPY, 1399
    VAGOTOMY, 1373
  RECTUM
    DIAGNOSIS, 1593, 1603
    THERAPY, 1603
  STOMACH
    DIAGNOSIS, 1371
    NEOPLASMS, BENIGN, 1372
    PANCREATITIS, 1666

BLIND LOOP SYNDROME
  MALABSORPTION
    FOLIC ACID, 954
    VITAMIN B2, 948*
    VITAMIN B12, 947*

BLOOD
  AMYLASE
    PANCREATITIS, 1657, 1663
  BILIRUBIN
    NEONATE, 1727*
  CLOTTING
    HEPATITIS, VIRAL, 1756*
  ENZYMES
    LIVER DISEASE, 1209
    PANCREAS DISEASE, 1209
  GASTRIN
    CIRCADIAN RHYTHM, 1002*
    DIETARY FACTORS, 1019
    HORMONE EFFECTS ON, 1892
    HYPOGLYCEMIA, 1001*, 1019
    PEPTIC ULCER, 1001*, 1002*
    VAGOTOMY, 1001*, 1009
    ZOLLINGER-ELLISON SYNDROME, 1892
  HEPATITIS, SERUM
    TRANSMISSION, 1779
  HEPATITIS, VIRAL
    TRANSMISSION, 1763*
  IMMUNOGLOBULINS
    GIARDIASIS, 1949*
  LIPASE
    PANCREATITIS, 1667
  LIPIDS
    LIVER DISEASE, 1715
  LIPOPROTEINS
    LIVER DISEASE, 1720
  PROTEIN
    CIRRHOSIS, 1844
  ZOLLINGER-ELLISON SYNDROME
    GASTRIC, 1885*

BLOOD FLOW
  SEE CIRCULATION

BLOOD GROUP
  DUODENUM
    ULCER, 1409

BLOOD VOLUME
  JAUNDICE, OBSTRUCTIVE, 1103

BROMOSULFOPHTHALEIN
  LIVER FUNCTION TESTS
    GILBERTS DISEASE, 1725*

BUDD-CHIARI SYNDROME
  ETIOLOGY
    CIRCULATION, 1674*

BURNS
  ESOPHAGUS
    CHILDREN, 1303
    THERAPY, 1303

CALCIFICATION
  ESOPHAGUS, 1317
  LIVER
    DISEASES ASSOCIATED WITH, 1713
  LIVER DISEASE
    DIAGNOSIS, 1695

CALCIUM
  LIVER
    ION TRANSPORT, 960
  PANCREAS
    SECRETION, 1034*
  STOMACH
    ACID SECRETION, 1029, 1344*

CALCULI
  PANCREAS
    ASCITES, 1646

CANCER
  SEE NEOPLASMS, MALIGNANT

CARBOHYDRATES
  LIVER DISEASE, ALCOHOLIC, 1810

CARBON TETRACHLORIDE
  LIVER
    INJURY, 1114, 1142
    ULTRASTRUCTURE, 913*
  LIVER INJURY
    ENZYMES, 1088, 1094
    FIBROSIS, 913*
    GLUCOSE-6-PHOSPHATE DEHYDROGENASE, 1095
    MITOCHONDRIA, 1088
    PREVENTION, 1052*
    ULTRASTRUCTURE, 1052*

CARBONIC ANHYDRASE
  PANCREAS
    OBSTRUCTION, 911*
    ULTRASTRUCTURE, 911*

CARCINOGENESIS
  LIVER, 1085, 1148
    MORPHOLOGY, 936
  STOMACH

        DIETARY FACTORS, 1008
        MORPHOLOGY, 1359
        POLYCYCLIC HYDROCARBONS, 1359

ARCINOID
    RECTUM, 1580, 1613

ATECHOLAMINE
    LIVER
        CIRCULATION, 920

ATECHOLAMINES
    DRUG TOXICITY
        HEPATITIS, NONVIRAL, 1744
    DUODENUM
        MORPHOLOGY, 933

ATHARTICS
    SEE LAXATIVES

ECUM
    SEE ALSO LARGE INTESTINE
    ADHESIONS
        PERITONEUM, 1523*
    DIVERTICULUM, 1544
    INTUSSUSCEPTION, 1612
    MICROORGANISMS
        BILE ACIDS, 1160

ELIAC DISEASE
    CHILDREN
        DIET, 1501
    CORTICOSTEROIDS, 1514
    DIAGNOSIS
        IMMUNOLOGY, 1626
    DISEASES ASSOCIATED WITH
        CIRCULATION, 1484*
        NEOPLASMS, MALIGNANT, 1504
    IMMUNOLOGY, 1484*
        GLUTEN, 1496
    SMALL INTESTINE
        IMMUNOLOGY, 1488*
        MORPHOLOGY, 1503

ELL SURVIVAL
    INTESTINE
        RADIATION, 941

ELLULOSE
    DIGESTION, 1178

HELATING AGENTS
    LIVER
        LYSOSOMES, 928

HEMICAL BURNS
    STOMACH
        GASTRECTOMY, 1378

HEMICAL COMPOSITION
    ANEMIA, PERNICIOUS
        SECRETION, 1883*
    ANTIGEN, AUSTRALIA, 1787
    BILE, 1090
        CHILDREN, 1083
        CHOLECYSTECTOMY, 1845*
        CHOLELITHIASIS, 1848
        CHOLERETIC AGENTS, 1132
        DIETARY FACTORS, 1081
    CHOLELITHIASIS
        CHOLESTEROL, 1882
    LIVER
        AMINO ACIDS, 1140
        ANTIHORMONES, 1115
        DIETARY FACTORS, 1140
        FATTY ACIDS, 1106, 1108
        HORMONES, 1115
        LIPIDS, 1108
        ULTRASTRUCTURE, 917*
    PANCREAS
        CHYMOTRYPSIN, 1046
        SECRETION, 1050
    ZOLLINGER-ELLISON SYNDROME
        SECRETION, 1883*

CHEMOTHERAPY
    LIVER
        NEOPLASMS, MALIGNANT, 1216

CHILDREN
    SEE ALSO NEONATE, AGE FACTORS
    APPENDECTOMY
        COMPLICATIONS, 1546
    BILE
        CHEMICAL COMPOSITION, 1083
    CELIAC DISEASE
        DIET, 1501
    CIRRHOSIS, 1824
    COLON
        POLYPS, 1598
    DIARRHEA
        ANTIBIOTICS, 1502
        ETIOLOGY, 1935
    ENTEROCOLITIS
        RADIOLOGY, 1201
    ESOPHAGUS
        BURNS, 1303
        DIVERTICULUM, 1331
    GALLBLADDER
        RUPTURE, 1865
    GASTROINTESTINAL
        BLEEDING, 1940
    GIARDIASIS
        MALABSORPTION, 1962
    HEPATITIS, VIRAL
        LIPIDS, 1782
        TRANSMISSION, 1775
    JAUNDICE
        DIAGNOSIS, 1260
    LIVER
        NEOPLASMS, MALIGNANT, 1216, 1682
    MALABSORPTION, 1497
        DIAGNOSIS, 1202
        REVIEWS, 1499, 1508
    NEOPLASMS
        LIVER, 1719
    PORTAL HYPERTENSION
        ETIOLOGY, 1940
        SURGERY, 1940
    SMALL INTESTINE
        MUCOSA, 1444
    STOMACH
        NEOPLASMS, BENIGN, 1347
    ULCERATIVE COLITIS
        IMMUNOSUPPRESSION, 1620

CHOLANGIOGRAPHY
    SEE ANGIOGRAPHY

- CHOLECYSTECTOMY
  - BILE
    - CHEMICAL COMPOSITION, 1845*

- CHOLECYSTITIS
  - EPIDEMIOLOGY, 1859
  - ETHNIC FACTORS, 1850
  - ETIOLOGY, 1401, 1877
  - MORPHOLOGY
    - IMMUNOLOGY, 1866
  - PREGNANCY
    - THERAPY, 1868
  - SURGERY, 1864

- CHOLECYSTOKININ
  - ABSORPTION
    - SMALL INTESTINE, 965
  - CHOLELITHIASIS
    - PREVENTION, 1077

- CHOLEDOCHOLITHIASIS
  - ANGIOGRAPHY, 1846*
  - DIAGNOSIS
    - RADIOLOGY, 1220
  - SURGERY, 1874
    - TECHNIQUES, 1862
  - THERAPY, 1846*

- CHOLELITHIASIS
  - BILE
    - CHEMICAL COMPOSITION, 1848
    - CHOLESTEROL, 1845*
    - STASIS, 1077
  - BILE ACIDS
    - METABOLISM, 1848
  - CHEMICAL COMPOSITION
    - CHOLESTEROL, 1882
  - CONSTITUTIONAL FACTORS, 1853
  - DIAGNOSIS
    - ECHOGRAPHY, 1268
  - EPIDEMIOLOGY, 1859
  - ETIOLOGY, 1401
    - DIETARY FACTORS, 1081
  - FLATULENCE
    - DYSPEPSIA, 1849
  - ILEUS
    - DISEASES ASSOCIATED WITH, 1572
    - ETIOLOGY, 1464
    - REVIEWS, 1863
  - PEPTIC ULCER
    - SEQUELAE, 1869
  - PREVENTION
    - CHOLECYSTOKININ, 1077
  - PYLORUS
    - OBSTRUCTION, 1881
  - SURGERY, 1876

- CHOLERA
  - CARBOHYDRATE, 1906
  - DIAGNOSIS
    - TOXIN, 1197*
  - DIARRHEA
    - SIMULATION, 1925
  - SMALL INTESTINE
    - ABSORPTION, 967

- CHOLERETIC AGENTS
  - BILE
    - CHEMICAL COMPOSITION, 1132
    - SECRETION, 1132, 1147

- CHOLESTASIS
  - DRUG TREATMENT
    - SEDATIVES, 1676*

- CHOLESTEROL
  - CHOLELITHIASIS
    - BILE, 1845*
    - CHEMICAL COMPOSITION, 1882
  - METABOLISM
    - LIVER, 1124
  - SYNTHESIS
    - LIVER, 1129

- CHOLINE
  - STOMACH
    - ABSORPTION, 1000*

- CHOLINERGIC AGENTS
  - ESOPHAGUS
    - MOTILITY, 978*
  - PANCREAS
    - SECRETION, 1042
  - STOMACH
    - ACID SECRETION, 1398

- CHOLINESTERASE
  - STOMACH
    - MORPHOLOGY, 924

- CHROMIUM
  - LIVER
    - COMPOSITION, 1691

- CHYMOTRYPSIN
  - PANCREAS
    - CHEMICAL COMPOSITION, 1046

- CIRCADIAN RHYTHM
  - BLOOD
    - GASTRIN, 1002*
  - LIVER
    - ENZYMES, 1053*, 1129
    - PHYSICAL PROPERTIES, 1186
  - STOMACH
    - ACID SECRETION, 1341*
    - CYCLIC ADENOSINE MONOPHOSPHATE, 1341*

- CIRCULATION
  - APPENDICITIS
    - DISEASES ASSOCIATED WITH, 1567
  - BILE
    - SECRETION, 1133
  - BUDD-CHIARI SYNDROME
    - ETIOLOGY, 1674*
  - CELIAC DISEASE
    - DISEASES ASSOCIATED WITH, 1484*
  - CIRRHOSIS
    - ANTIBODIES, 1834
    - DISEASES ASSOCIATED WITH, 1830
  - COLITIS
    - ISCHEMIA, 1543
  - GASTRECTOMY
    - COMPLICATIONS, 1376
  - GASTROINTESTINAL
    - DRUG EFFECTS ON, 1891
  - JEJUNUM

    - DUMPING SYNDROME, 1436
    - SHOCK, 1923
  - LIVER
    - ACETYLCHOLINE, 920
    - ANGIOGRAPHY, 1183
    - CATECHOLAMINE, 920
    - DRUG EFFECTS ON, 1107
    - GAS, 1455
    - JAUNDICE, OBSTRUCTIVE, 1179
    - MORPHOLOGY, 926
    - NERVOUS CONTROL, 920
    - OBSTRUCTION, BILIARY TRACT, 919*
    - PARASITES AND PARASITIC DISEASES, 1951*
    - PORTAL HYPERTENSION, 1843
    - REGENERATION, 1116
    - SURGERY, 1174
    - TRANSPLANTATION, 1100
    - TRAUMA, 1180
    - VASOCONSTRICTORS, 1107
  - LIVER DISEASE
    - DISEASES ASSOCIATED WITH, 1724
  - PANCREAS
    - PSEUDOCYST, 1662
  - PORTAL HYPERTENSION
    - SURGERY, 1821*
  - SCHISTOSOMIASIS
    - LIVER, 1967
  - SMALL INTESTINE
    - NERVOUS CONTROL, 1182
    - OBSTRUCTION, 1463
  - STOMACH
    - NERVOUS CONTROL, 1182
    - SECRETION, 1182
    - STRESS, 1170*

- IRRHOSIS
  - ANTIBODIES
    - CIRCULATION, 1834
  - ANTIENZYME
    - DEFICIENCY, 1675*
  - ANTIGEN, AUSTRALIA
    - MICROSCOPY, 1762*
  - ASCITES
    - DIURETICS, 1842
  - BILE ACIDS
    - METABOLISM, 1819*
  - BILIARY TRACT
    - MORPHOLOGY, 1793*
  - BLOOD
    - PROTEIN, 1844
  - CHILDREN, 1824
  - COMPLICATIONS
    - CLOTTING, 1834
  - COPPER
    - METABOLISM, 1678*
  - CYSTIC FIBROSIS
    - DISEASES ASSOCIATED WITH, 1837
  - DIAGNOSIS
    - BIOPSY, 1831
    - ECHOGRAPHY, 1228
  - DISEASES ASSOCIATED WITH, 1796*, 1820*
    - CIRCULATION, 1830
    - ETIOLOGY, 1830
    - MUSCULOSKELETAL SYSTEM, 1825, 1839
    - SCLERODERMA, 1835
  - DRUG EFFECTS ON
    - KIDNEY, 1822*
  - DRUG METABOLISM
    - ANTIBIOTICS, 1832
  - DRUG TREATMENT, 1829
  - ETIOLOGY
    - ANTIBODIES, 1677*
    - ARSENIC, 1836
    - LAXATIVES, 1737*
  - IMMUNOGLOBULINS
    - ANTIBODIES, 1800
  - IMMUNOLOGY, 1796*, 1798*
  - IMMUNOSUPPRESSION, 1794*
  - LIVER
    - COLLAGEN, 1061*
    - COPPER, 1824
    - MORPHOLOGY, 1820*, 1826, 1828, 1831
    - REGENERATION, 1061*
    - ULTRASTRUCTURE, 1820*
  - PANCREAS
    - ETIOLOGY, 1630
    - SYPHILIS, 1630
  - PORTACAVAL SHUNT
    - GLUCOSE TOLERANCE, 1817*
  - SURGERY
    - TECHNIQUES, 1818*
  - TRANQUILIZERS, 1840

- CLOTTING
  - BLOOD
    - HEPATITIS, VIRAL, 1756*
  - CIRRHOSIS
    - COMPLICATIONS, 1834
  - DRUG TREATMENT
    - HEPATITIS, CHRONIC, 1804

- COLITIS
  - SEE ALSO ULCERATIVE COLITIS
  - DIAGNOSIS, 1554
  - ISCHEMIA
    - ANGIOGRAPHY, 1543
    - CIRCULATION, 1543
  - MORPHOLOGY, 1554
  - SIGMOID
    - NEOPLASMS, MALIGNANT, 1609

- COLITIS, PSEUDOMEMBRANOUS
  - RADIOLOGY, 1586

- COLLAGEN
  - LIVER
    - CIRRHOSIS, 1061*

- COLLAGEN DISEASES
  - HEPATITIS, CHRONIC
    - DISEASES ASSOCIATED WITH, 1795*
  - PERITONITIS
    - DISEASES ASSOCIATED WITH, 1901
  - PROTEIN-LOSING ENTEROPATHY
    - DISEASES ASSOCIATED WITH, 1438

- COLON
  - SEE ALSO LARGE INTESTINE
  - ABSORPTION
    - AMMONIA, 945*
  - ANOMALY, CONGENITAL
    - SURGERY, 1324
  - BIOPOTENTIALS
    - ION EFFECTS ON, 987
  - DIAGNOSIS
    - RADIOLOGY, 1284

  - DISEASES, 1541
  - DIVERTICULUM
    - BLEEDING, 1525*
    - FISTULA, 1534
    - RADIOLOGY, 1531
    - SURGERY, 977*
  - ENEMA, 1550
  - GARDNERS SYNDROME, 1540
  - GAS, 1577
  - IMMUNOLOGY
    - ULCERATIVE COLITIS, 1617
  - INFLAMMATION
    - DIAGNOSIS, 1531
  - MALACOPLAKIA
    - MORPHOLOGY, 1610
    - ULTRASTRUCTURE, 1610
  - MORPHOLOGY
    - ANOMALY, 1578
  - MOTILITY
    - CONSTIPATION, 1942
    - DIARRHEA, 1942
    - ION EFFECTS ON, 987
    - NERVOUS CONTROL, 982*
    - SURGERY, 977*
  - NEOPLASMS, BENIGN, 1540
  - NEOPLASMS, MALIGNANT
    - DRUG TREATMENT, 1933
    - IMMUNOLOGY, 1526*, 1905
    - METASTASES, 1933
    - RECURRENCE, 1595
  - PANCREATITIS
    - SEQUELAE, 1652*
  - POLYPS, 1607
    - CHILDREN, 1598
    - COMPLICATIONS, 1576
    - FAMILIAL FACTORS, 1576, 1592, 1598
    - LYMPHATICS, 1585
    - THERAPY, 1599
  - SURGERY
    - COMPLICATIONS, 1552
    - SURVIVAL, 1552
    - TECHNIQUES, 1551

- COLON, IRRITABLE
  - REVIEWS, 1559

- COMPLEMENT
  - HEPATITIS, VIRAL
    - IMMUNOLOGY, 1784

- COMPOSITION
  - LIVER
    - CHROMIUM, 1691

- COMPUTER
  - TECHNIQUES
    - ABSORPTION, 962

- COMPUTERS
  - DIAGNOSIS, 1922

- CONGENITAL
  - PYLORUS
    - STENOSIS, 1364

- CONSTIPATION
  - COLON
    - MOTILITY, 1942
  - LAXATIVES
    - COMPLICATIONS, 1914

- CONSTITUTIONAL FACTORS
  - CHOLELITHIASIS, 1853

- CONTRAST MEDIA
  - LIVER DISEASES
    - ETIOLOGY, 1690
  - PANCREAS
    - DIAGNOSIS, 1257

- COPPER
  - LIVER
    - CIRRHOSIS, 1824
  - METABOLISM
    - CIRRHOSIS, 1678*
    - HEPATITIS, VIRAL, 1769
    - WILSONS DISEASE, 1678*

- CORI DISEASE
  - LIVER
    - GLYCOGEN, 1709

- CORTICOSTEROIDS
  - CELIAC DISEASE, 1514
  - DUODENUM
    - PHOSPHATASE, 1136
  - GASTROINTESTINAL
    - MOTILITY, 988
  - HEPATITIS, CHRONIC
    - DRUG TREATMENT, 1802
  - LIVER
    - PHOSPHATASE, 1136
    - REGENERATION, 1116
  - PROTEIN-LOSING ENTEROPATHY
    - DRUG TREATMENT, 1491
  - ULCER
    - DUODENUM, 1422

- CROHNS DISEASE
  - ABDOMEN
    - ABSCESS, 1584
  - APPENDIX, 1587
  - COMPLICATIONS, 1475, 1479
  - DIAGNOSIS
    - IMMUNOLOGY, 1626
  - DIET, 1624
  - DISEASES ASSOCIATED WITH
    - LIVER, 1482
    - MEGACOLON, 1611
    - MUSCULOSKELETAL SYSTEM, 1468*
    - NEOPLASMS, MALIGNANT, 1467*, 1473
  - EPIDEMIOLOGY, 1478, 1623
  - ILEUM
    - DILATATION, 1475
    - ULTRASTRUCTURE, 1481
  - IMMUNOLOGY, 1472, 1481
  - LARGE INTESTINE
    - FLORA, 1470*
    - IMMUNOSUPPRESSION, 1584
    - THERAPY, 1582
  - LIVER FUNCTION TESTS, 1482
  - MAGNESIUM
    - DEFICIENCY, 1582
  - MALABSORPTION, 1471, 1482
  - RECTUM
    - NEOPLASMS, MALIGNANT, 1473
  - RECURRENCE, 1477
  - REVIEWS, 1476, 1483, 1619

- SMALL INTESTINE
  - FLORA, 1470*
  - PERFORATION, 1474, 1479
  - RADIOLOGY, 1471
- SURGERY
  - IMMUNOLOGY, 1616*
  - RECURRENCE, 1469*
- THERAPY, 1471
- ULTRASTRUCTURE, 1621

YCLIC ADENOSINE MONOPHOSPHATE
- LIVER
  - DIETARY FACTORS, 1080
- PANCREAS
  - SECRETION, 1033*, 1034*
- STOMACH
  - ACID SECRETION, 1011
  - CIRCADIAN RHYTHM, 1341*
  - SECRETION, 994*

YSTIC FIBROSIS
- APPENDIX
  - MORPHOLOGY, 1627*
- DISEASES ASSOCIATED WITH
  - CIRRHOSIS, 1837
- SCANNING, SCINTILLATION
  - LIVER, 1699

YSTS
- LIVER
  - SCANNING, SCINTILLATION, 1708
- PANCREAS
  - ECHINOCOCCOSIS, 1649

EATH
- SEE SURVIVAL

FFICIENCY
- GLUCOSE-6-PHOSPHATE DEHYDROGENASE
  - JAUNDICE, 1730
- IMMUNOGLOBULINS
  - DISEASES ASSOCIATED WITH, 1480
- MAGNESIUM
  - CROHNS DISEASE, 1582

EGLUTITION
- ESOPHAGUS
  - MOTILITY, 974*

-DEOXY-D-GLUCOSE
- STOMACH
  - ACID SECRETION, 1248

IABETES
- ABSORPTION
  - GALACTOSE, 952
- DISEASES ASSOCIATED WITH
  - FATTY LIVER, 1747
- LIVER
  - GLUCONEOGENESIS, 1056*
- LIVER FUNTION TESTS, 1203
- PANCREAS
  - SECRETION, 1044
- PANCREATITIS
  - SEQUELAE, 1653*
- SULFOBROMOPHTHALEIN TEST, 1203

IAGNOSIS
- ABDOMEN
  - ACUTE, 1919, 1920, 1921, 1922
  - ANGIOGRAPHY, 1213, 1240
  - RADIOLOGY, 1242
- ACHALASIA
  - PRESSURE STUDIES, 1328
  - RADIOLOGY, 1328
- ANUS
  - SPHINCTER, 1251
- APPENDICITIS, 1264
- BILE DUCT
  - ANGIOGRAPHY, 1223
  - NEOPLASMS, MALIGNANT, 1696
- BILIARY TRACT
  - ANGIOGRAPHY, 1221, 1235
  - RADIOLOGY, 1220
- GASTROINTESTINAL
  - NEOPLASMS, MALIGNANT, 1934
- CELIAC DISEASE
  - IMMUNOLOGY, 1626
- CHOLEDOCHOLITHIASIS
  - RADIOLOGY, 1220
- CHOLELITHIASIS
  - ECHOGRAPHY, 1268
- CHOLERA
  - TOXIN, 1197*
- CIRRHOSIS
  - BIOPSY, 1831
  - ECHOGRAPHY, 1228
- COLITIS, 1554
- COLON
  - INFLAMMATION, 1531
  - RADIOLOGY, 1284
- COMPUTERS, 1922
- CROHNS DISEASE
  - IMMUNOLOGY, 1626
- DIARRHEA
  - BACTERIA, 1902
- DIVERTICULUM, MECKELS
  - NEOPLASMS, BENIGN, 1446
- DUODENUM
  - ANGIOGRAPHY, 1267
  - ENDOSCOPY, 1280, 1288
  - NEOPLASMS, BENIGN, 1453
  - NEOPLASMS, MALIGNANT, 1288, 1453
  - RADIOLOGY, 1244
  - TECHNIQUES, 1453
  - ULCER, 1244
- ECHINOCOCCOSIS
  - IMMUNOLOGY, 1952
- ESOPHAGITIS, REFLUX, 1309
- ESOPHAGUS
  - ENDOSCOPY, 1329
  - PRESSURE STUDIES, 985
  - RADIOLOGY, 1325, 1329, 1331, 1338
  - REFLUX, 1300
  - REVIEWS, 1243
  - RUPTURE, 1252
- GASTRITIS
  - PROTEASE, 1191*
  - RADIOLOGY, 1348
- GASTROINTESTINAL
  - BLEEDING, 1939
  - EDEMA, 1899
  - MOTILITY, 990
  - NEOPLASMS, MALIGNANT, 1886*
  - RADIOISOTOPES, 1286
  - RADIOLOGY, 990, 1894
  - REVIEWS, 1286
- HEPATITIS, VIRAL

        - ANTIGEN, AUSTRALIA, 1282
        - ENZYMES, 1285
    - HERNIA, HIATUS, 1339
    - HIRSCHSPRUNGS DISEASE
        - PRESSURE STUDIES, 1188*
    - ILEUS
        - RADIOLOGY, 1205
    - JAUNDICE
        - ANGIOGRAPHY, 1250
        - CHILDREN, 1260
        - LIVER FUNCTION TESTS, 1222
        - NEONATE, 1260
        - RADIOLOGY, 1222
    - JAUNDICE, OBSTRUCTION
        - MARKER STUDIES, 1198
    - JAUNDICE, OBSTRUCTIVE, 1208
        - ANGIOGRAPHY, 1250
        - RADIOLOGY, 1220
    - KWASHIORKOR
        - TRANSFERRIN, 1946
    - LARGE INTESTINE
        - BIOPSY, 1207
        - ISCHEMIA, 1528, 1932
        - NEOPLASMS, MALIGNANT, 1519*
    - LIVER
        - AMEBIASIS, 1960
        - ECHOGRAPHY, 1227, 1228
        - RADIOLOGY, 1222
        - SCANNING, SCINTILLATION, 1195*, 1249
    - LIVER DISEASE
        - ANTIGEN, AUSTRALIA, 1217
        - BIOPSY, 1226
        - CALCIFICATION, 1695
        - ENZYMES, 1259, 1688, 1697, 1707
        - PHOSPHATASE, ALKALINE, 1246
        - SCANNING, SCINTILLATION, 1218, 1225
        - TRACER STUDIES, 1218
    - LIVER DISEASES
        - SCANNING, SCINTILLATION, 1199
    - MALABSORPTION
        - CHILDREN, 1202
    - NEOPLASMS, MALIGNANT
        - ECHOGRAPHY, 1189*
    - PANCREAS
        - ABSCESS, 1190*
        - BICARBONATE, 1281
        - BIOPSY, 1258
        - CONTRAST MEDIA, 1257
        - ENDOSCOPY, 1253, 1288
        - ENZYMES, 1229
        - NEOPLASMS, MALIGNANT, 1288, 1638
        - PANCREAS FUNCTION TESTS, 1234
        - PSEUDOCYST, 1190*
        - SCANNING, SCINTILLATION, 1254
        - TECHNIQUES, 1258
    - PANCREAS DISEASE, 1233
        - AMYLASE, 1269
        - ANGIOGRAPHY, 1241, 1270
        - ECHOGRAPHY, 1261
        - LIPASE, 1269
        - MOTILITY, 1241
        - RADIOLOGY, 1261
        - REVIEWS, 1634
        - SCANNING, SCINTILLATION, 1241, 1261
        - TECHNIQUES, 1272
        - TRYPSIN, 1214
    - PANCREATITIS
        - AMYLASE, 1294*
        - ECHOGRAPHY, 1189*
        - ENDOSCOPY, 1196*
        - RADIOLOGY, 1237
        - REVIEWS, 1669
        - SCANNING, SCINTILLATION, 1190*
    - PARASITES AND PARASITIC DISEASE
        - TECHNIQUES, 1231
    - PEPTIC ULCER
        - ENDOSCOPY, 1289
        - PEPSINOGEN, 1224
    - PERITONITIS
        - TECHNIQUES, 1901
    - PROTEIN
        - RADIOISOTOPE, 1345*
    - RECTUM, 1251
        - BLEEDING, 1593, 1603
    - SMALL INTESTINE
        - BIOPSY, 1207
        - ENDOSCOPY, 1256
        - NEOPLASMS, BENIGN, 1442, 1465
        - NEOPLASMS, MALIGNANT, 1442, 1465
        - OBSTRUCTION, 1456
    - STEATORRHEA
        - MARKER STUDIES, 1219
    - STOMACH
        - ACID SECRETION, 1271
        - ANOMALY, 1377
        - BIOPSY, 1207, 1271
        - BLEEDING, 1371
        - CYTOLOGY, 1255
        - ENDOSCOPY, 1255, 1274, 1289, 1290, 1352
        - FISTULA, 1358
        - NEOPLASMS, BENIGN, 1351, 1357
        - NEOPLASMS, MALIGNANT, 1278, 1289, 1290, 1343*, 1350, 1352, 1363, 1366, 1374
        - POLYPS, 1366
        - RADIOISOTOPES, 1278
        - RADIOLOGY, 1255, 1274, 1363
        - ULCER, 1419
    - ULCERATIVE COLITIS
        - IMMUNOLOGY, 1626
    - WHIPPLES DISEASE
        - BIOPSY, 1437
    - ZOLLINGER-ELLISON SYNDROME
        - GASTRIN, 1397

- DIALYSIS
    - KIDNEY
        - HEPATITIS, NONVIRAL, 1738*
    - LIVER
        - BIOCHEMISTRY, 1149
        - FIBRINOLYSIS, 1090, 1139
        - HEMATOLOGY, 1149
    - LIVER DISEASE
        - TREATMENT, 1716
    - PANCREATITIS
        - THERAPY, 1658

- DIARRHEA
    - CHILDREN
        - ANTIBIOTICS, 1502
    - CHOLERA
        - SIMULATION, 1925
    - COLON
        - MOTILITY, 1942

    DIAGNOSIS
        BACTERIA, 1902
    EPIDEMIOLOGY, 1893
    ETIOLOGY
        BACTERIA, 1902, 1935
        CHILDREN, 1935
        ESCHERICHIA COLI, 1889
        GIARDIASIS, 1961
        ION TRANSPORT, 1916
        MICROORGANISMS, 1893
        REVIEWS, 1912, 1926
    LACTOSE INTOLERANCE, 1492
    MALABSORPTION
        MAGNESIUM, 1900
        MALNUTRITION, 1502
    MALNUTRITION
        ETIOLOGY, 1492
    NEONATE
        ANTIBIOTICS, 1889
        THERAPY, 1889
    PEPTIC ULCER
        SURGERY, 1384*
    SIMULATION, 1916
    SMALL INTESTINE
        ENZYMES, 1457
        ION TRANSPORT, 1887*
        MORPHOLOGY, 1457
    THERAPY
        SURGERY, 1365

DIET
    CELIAC DISEASE
        CHILDREN, 1501
    CROHNS DISEASE, 1624
    GASTROINTESTINAL
        DISEASES, 1896
    LARGE INTESTINE
        DIVERTICULITIS, 1571
        DIVERTICULUM, 1571
    PEPTIC ULCER, 1412
    SMALL INTESTINE
        MORPHOLOGY, 1501
    ULCERATIVE COLITIS, 1624

DIET THERAPY
    ALCOHOL
        METABOLISM, 1815

DIETARY FACTORS
    BILE
        CHEMICAL COMPOSITION, 1081
    BLOOD
        GASTRIN, 1019
    CHOLELITHIASIS
        ETIOLOGY, 1081
    ESOPHAGUS
        NEOPLASMS, MALIGNANT, 1332
        TEMPERATURE, 1321
    GLYCOGEN
        METABOLISM, 1070
    HYPERBILIRUBINEMIA, 1086
    IRON
        DYSPHAGIA, 1301
    LIVER
        AMINO ACIDS, 942
        AMYLASE, 1091
        CHEMICAL COMPOSITION, 1140
        CYCLIC ADENOSINE MONOPHOSPHATE,
          1080
        DRUG METABOLISM, 1099, 1151
        ENZYMES, 942, 1097, 1099, 1112,
          1140
        FATTY ACIDS, 1079, 1112
        GLUCONEOGENESIS, 1056*, 1117
        LIPIDS, 1078, 1092, 1112
        METABOLISM, 1108
        PROTEIN, 1073
    LIVER DISEASE, ALCOHOLIC, 1814
    LIVER INJURY, 1093
    MALABSORPTION
        EPIDEMIOLOGY, 1505
    METABOLISM
        BILIRUBIN, 1086
        UREA, 1176
    PANCREAS
        NUCLEIC ACIDS, 1043
        SECRETION, 1042, 1050
    PROTEIN
        LIVER, 1099
    SMALL INTESTINE
        MITOCHONDRIA, 914*
        PHOSPHATASE, ALKALINE, 1168
        ULTRASTRUCTURE, 914*
    STOMACH
        ACID SECRETION, 1007, 1019
        CARCINOGENESIS, 1008
        SECRETION, 1008
    TRANSPORT
        SMALL INTESTINE, 957

DIGESTION
    ANOMALY
        DRUG-INDUCED, 1927
    CELLULOSE, 1178

DILATATION
    ESOPHAGUS
        ACHALASIA, 1291*
        ANOMALIES, 1319
        STENOSIS, 1292*
        STRICTURE, 1315
    ILEUM
        CROHNS DISEASE, 1475

DISACCHARIDASE
    SEE ALSO LACTASE
    INTESTINE
        TECHNIQUES, 1447
    SMALL INTESTINE
        PEPTIC ULCER SURGERY, 1450

DISEASE ASSOCIATED WITH
    HEPATITIS, VIRAL
        UROGENITAL SYSTEM, 1788
    LIVER DISEASE
        ENDOCRINE SYSTEM, 1694

DISEASES
    COLON, 1541
    GALLBLADDER
        SEX FACTORS, 1859
        SURVIVAL, 1859
    GASTROINTESTINAL
        ALLERGY, 1911
        DIET, 1896
        HORMONE EFFECTS ON, 1943
        LYMPHATICS, 1913
    STOMACH

    - EPIDEMIOLOGY, 1352
    - PEPTIDES, 1021

- DISEASES ASSOCIATED WITH
  - ABDOMEN
    - ACUTE, 1899
  - ANEMIA
    - MALABSORPTION, 1434
  - ANEMIA, PERNICIOUS
    - NEOPLASMS, MALIGNANT, 1343*
  - APPENDICITIS
    - CIRCULATION, 1567
  - BILIARY TRACT
    - ANOMALY, CONGENITAL, 1873
    - ATRESIA, 1839
  - CELIAC DISEASE
    - CIRCULATION, 1484*
    - NEOPLASMS, MALIGNANT, 1504
  - CHOLELITHIASIS
    - ILEUS, 1572
  - CIRRHOSIS, 1796*, 1820*
    - CIRCULATION, 1830
    - ETIOLOGY, 1830
    - MUSCULOSKELETAL SYSTEM, 1825, 1839
    - SCLERODERMA, 1835
  - CROHNS DISEASE
    - LIVER, 1482
    - MEGACOLON, 1611
    - MUSCULOSKELETAL SYSTEM, 1468*
    - NEOPLASMS, MALIGNANT, 1467*, 1473
  - CYSTIC FIBROSIS
    - CIRRHOSIS, 1837
  - DIABETES
    - FATTY LIVER, 1747
  - DOWNS SYNDROME, 1947
  - DUODENUM
    - DIVERTICULUM, 1851
    - ULCER, 1379, 1414
  - DYSPHAGIA
    - MUSCULOSKELETAL SYSTEM, 1313
  - ECHINOCOCCOSIS
    - RESPIRATORY SYSTEM, 1952
  - ESOPHAGITIS, REFLUX, 1311
    - HERNIA, HIATUS, 1307
    - NERVOUS SYSTEM, 1307
    - RESPIRATORY SYSTEM, 1309
  - ESOPHAGUS
    - ATRESIA, 1312
    - NEOPLASMS, BENIGN, 1317
  - ESOPHAGUS DISEASES
    - FISTULA, 1312
    - MUSCULOSKELETAL SYSTEM, 1312
  - FECES
    - LEUKOCYTES, 1902
  - GASTRECTOMY
    - ANEMIA, PERNICIOUS, 1163
  - GASTRITIS
    - NEOPLASMS, MALIGNANT, 1349
  - GASTROINTESTINAL
    - ANOMALY, 1915
    - BLEEDING, 1939
    - NEOPLASMS, 1908
  - GIARDIASIS
    - MALABSORPTION, 1962
  - HEPATITIS
    - PANCREAS DISEASE, 1770
    - SYPHILIS, 1740*
  - HEPATITIS, CHRONIC, 1796*
    - ALLERGY, 1804
    - COLLAGEN DISEASES, 1795*
    - ENDOCRINE SYSTEM, 1802
  - HEPATITIS, VIRAL
    - MUSCULOSKELETAL SYSTEM, 1765, 1789
    - NERVOUS SYSTEM, 1781
  - HERNIA, HIATUS, 1319
    - ESOPHAGITIS, REFLUX, 1302
    - RADIOLOGY, 1320
  - IMMUNOGLOBULINS
    - DEFICIENCY, 1480
  - INTESTINE
    - LYMPHANGIECTASIA, 1490
  - KWASHIORKOR
    - LIVER DISEASE, 1494
  - LARGE INTESTINE
    - NEOPLASMS, MALIGNANT, 1562
  - LIVER
    - CALCIFICATION, 1713
  - LIVER DISEASE
    - CIRCULATION, 1724
    - STEATORRHEA, 1487*
  - MALNUTRITION
    - LIVER DISEASE, 1493
  - MENETRIERS DISEASE, 1345*
  - PANCREAS
    - NEOPLASMS, BENIGN, 1631
    - NEOPLASMS, MALIGNANT, 1467*
  - PANCREATITIS
    - RESPIRATORY SYSTEM, 1655
  - PARASITES AND PARASITIC DISEASES
    - PORTAL HYPERTENSION, 1951*
    - RESPIRATORY SYSTEM, 1964
  - PARASITES AND PARISITIC DISEASES
    - ILEUS, 1966
  - PEPTIC ULCER
    - GASTRITIS, 1391*
  - PERITONITIS
    - COLLAGEN DISEASES, 1901
  - PORTAL HYPERTENSION, 1965
  - PROTEIN-LOSING ENTEROPATHY
    - COLLAGEN DISEASES, 1438
    - MUSCULOSKELETAL SYSTEM, 1438
  - SCHISTOSOMIASIS
    - FIBROSIS, 1969
    - PORTAL HYPERTENSION, 1954
  - SMALL INTESTINE
    - NEOPLASMS, MALIGNANT, 1467*
  - STOMACH
    - NEOPLASMS, MALIGNANT, 1343*, 1349, 1356, 1379
    - ULCER, 1414
    - UROGENITAL SYSTEM, 931
  - ULCER
    - DUODENUM, 1424
    - GASTRITIS, 1391*
    - STOMACH, 1424
  - ULCERATIVE COLITIS, 1614*, 1618
    - MUSCULOSKELETAL SYSTEM, 1468*
  - ZOLLINGER-ELLISON SYNDROME
    - ENDOCRINE SYSTEM, 1346*

- DISTENSION
  - JEJUNUM
    - DUMPING SYNDROME, 1436

- DIURETICS
  - CIRRHOSIS
    - ASCITES, 1842

- IVERTICULITIS
  - LARGE INTESTINE
    - DIET, 1571

- IVERTICULUM
  - APPENDIX, 1606
  - CECUM, 1544
  - COLON
    - BLEEDING, 1525*
    - FISTULA, 1534
    - RADIOLOGY, 1531
    - SURGERY, 977*
  - DUODENUM, 1451
    - AMPULLA OF VATER, 1452
    - DISEASES ASSOCIATED WITH, 1851
    - RADIOLOGY, 1628
  - ESOPHAGUS
    - ADOLESCENTS, 1305
    - CHILDREN, 1331
    - ETIOLOGY, 1325
    - SURGERY, 1325
  - GALLBLADDER, 1871
  - LARGE INTESTINE
    - BLEEDING, 1600
    - DIET, 1571
  - SIGMOID, 1591
  - SMALL INTESTINE
    - MORPHOLOGY, 1441

- IVERTICULUM, MECKELS
  - NEOPLASMS, BENIGN
    - BLEEDING, 1446
    - DIAGNOSIS, 1446
    - THERAPY, 1446

- OWNS SYNDROME
  - DISEASES ASSOCIATED WITH, 1947
  - GASTROINTESTINAL
    - ANOMALY, 1947

- RUG ADDICTION
  - HEPATITIS, VIRAL
    - EPIDEMIOLOGY, 1772
    - ETIOLOGY, 1766

- RUG EFFECTS ON
  - BILIRUBIN
    - METABOLISM, 1057*, 1058*
  - DUODENUM
    - MOTILITY, 981*
  - GAS, INTESTINAL
    - ANTIBIOTICS, 1936
  - GASTROINTESTINAL
    - CIRCULATION, 1891
  - ILEUM
    - PERISTALSIS, 992
  - IRON
    - METABOLISM, 1065*
  - KIDNEY
    - CIRRHOSIS, 1822*
  - LIVER
    - CIRCULATION, 1107
    - ENZYMES, 1058*
    - METABOLISM, 1134
    - REGENERATION, 1061*
    - ULTRASTRUCTURE, 966
    - UREA SYNTHESIS, 1067*
  - LIVER INJURY, 923
    - GALACTOSAMINE, 1067*
  - ODDI, SPHINCTER OF
    - MOTILITY, 981*
  - PEPSIN
    - SECRETION, 1398
  - SMALL INTESTINE
    - MOTILITY, 984
  - STOMACH
    - MOTILITY, 986, 1406
    - PEPSIN, 996*, 1022
    - SECRETION, 994*, 996*
  - TRIGLYCERIDE
    - METABOLISM, 1122

- DRUG-INDUCED
  - DIGESTION
    - ANOMALY, 1927
  - GASTROINTESTINAL
    - ANOMALY, 1927

- DRUG METABOLISM
  - ANTIBIOTICS
    - CIRRHOSIS, 1832
  - LIVER
    - ANTICOAGULANTS, 1098
    - DIETARY FACTORS, 1099, 1151
    - IRON, 1151
    - REVIEWS, 1753
    - ULTRASTRUCTURE, 1146

- DRUG TOXICITY
  - ANTIBACTERIALS
    - HEPATITIS, NONVIRAL, 1745
    - LIVER FUNCTION TESTS, 1754
  - CATECHOLAMINES
    - HEPATITIS, NONVIRAL, 1744
  - HEPATITIS, NONVIRAL
    - REVIEWS, 1753
  - LIVER
    - ANTIBIOTICS, 1751
    - TISSUE CULTURE, 1743

- DRUG TREATMENT
  - BILIARY OBSTRUCTION, 1680
  - BILIARY TRACT DISEASE, 1872
  - CHOLESTASIS
    - SEDATIVES, 1676*
  - CIRRHOSIS, 1829
  - CLOTTING
    - HEPATITIS, CHRONIC, 1804
  - COLON
    - NEOPLASMS, MALIGNANT, 1933
  - ESOPHAGITIS, REFLUX, 1322
  - ESOPHAGUS
    - PAIN, 985
    - STENOSIS, 1292*
  - GASTROINTESTINAL
    - BLEEDING, 1884*
  - HEPATITIS, CHRONIC
    - CORTICOSTEROIDS, 1802
    - IMMUNOLOGY, 1796*
  - HYPERBILIRUBINEMIA
    - NEONATE, 1734
  - HYPERCHLORHYDRIA, 1017
    - ANTICHOLINERGIC AGENTS, 1382
    - TRANQUILIZERS, 1382
  - ILEUS
    - HORMONES, 1431*
  - LIVER
    - AMEBIASIS, 1957

    LIVER DISEASE, 1829
    PEPTIC ULCER, 1022, 1412
        ANTICHOLINERGIC AGENTS, 1392*
        ANTICHOLINERGIC AGNETS, 1402
        BLEEDING, 1383*, 1386*, 1428
        HORMONES, 995*
    PROTEIN-LOSING ENTEROPATHY
        CORTICOSTEROIDS, 1491
    SCHISTOSOMIASIS
        COMPLICATIONS, 1953
    STOMACH
        NEOPLASMS, MALIGNANT, 1933
        ULCER, 1415
    TUBERCULOSIS
        MALABSORPTION, 1498

DRUGS
    FATTY LIVER
        PREVENTION, 1121
    HYPERBILIRUBINEMIA
        PREVENTION, 1727*
    SMALL INTESTINE
        ABSORPTION, 944*

DUBIN-JOHNSON SYNDROME
    LIVER
        PIGMENTATION, 1726*
        ULTRASTRUCTURE, 1726*

DUMPING SYNDROME
    JEJUNUM
        CIRCULATION, 1436
        DISTENSION, 1436
    SURGERY
        TECHNIQUES, 1361
    THERAPY
        SURGERY, 1365

DUODENUM
    SEE ALSO SMALL INTESTINE
    ANOMALY, CONGENITAL, 1855
    DIAGNOSIS
        ANGIOGRAPHY, 1267
        ENDOSCOPY, 1280, 1288
        RADIOLOGY, 1244
        TECHNIQUES, 1453
    DIVERTICULUM, 1451
        AMPULLA OF VATER, 1452
        DISEASES ASSOCIATED WITH, 1851
        RADIOLOGY, 1628
    ENDOSCOPY
        TECHNIQUES, 1232, 1280
    HEMATOMA, 1440
    MORPHOLOGY
        CATECHOLAMINES, 933
        EMBRYOLOGY, 921
        NERVOUS SYSTEM, 921
    MOTILITY
        DRUG EFFECTS ON, 981*
        GLUCAGON, 975*
    NEOPLASMS
        SCANNING, SCINTILLATION, 1187*
    NEOPLASMS, BENIGN
        DIAGNOSIS, 1453
    NEOPLASMS, MALIGNANT
        DIAGNOSIS, 1288, 1453
        SURGERY, 1651
    NUCLEIC ACIDS
        PENTAGASTRIN, 993
    OBSTRUCTION
        NEONATE, 1455
        RADIOLOGY, 1455
    PHOSPHATASE
        AGE FACTORS, 1136
        CORTICOSTEROIDS, 1136
    RADIOLOGY
        GALLBLADDER DISEASE, 1239
        PANCREATITIS, 1239
        STOMACH DISEASE, 1239
        TECHNIQUES, 975*
    SURGERY
        COMPLICATIONS, 1421
    TRAUMA
        BIOPSY, 1440
        SURGERY, 1629
    ULCER
        BLEEDING, 1409
        BLOOD GROUP, 1409
        CORTICOSTEROIDS, 1422
        DIAGNOSIS, 1244
        DISEASES ASSOCIATED WITH, 1379,
          1414, 1424
        GASTRIN, 1397
        PEPSINOGE.., 1422
        SEX FACTORS, 1409
        SURGERY, 1390*, 1420, 1425
        VAGOTOMY, 1406
    ULTRASTRUCTURE
        EMBRYOLOGY, 918*

DUODENUM ULCER
    SEE ALSO PEPTIC ULCER

DYSPEPSIA
    FLATULENCE
        CHOLELITHIASIS, 1849

DYSPHAGIA
    DIETARY FACTORS
        IRON, 1301
    DISEASES ASSOCIATED WITH
        MUSCULOSKELETAL SYSTEM, 1313
    ESOPHAGUS
        NEOPLASMS, MALIGNANT, 1297

ECHINOCOCCOSIS
    DIAGNOSIS
        IMMUNOLOGY, 1952
    DISEASES ASSOCIATED WITH
        RESPIRATORY SYSTEM, 1952
    LIVER
        ABSCESS, 1952
    PANCREAS
        CYSTS, 1649

ECHOGRAPHY
    CHOLELITHIASIS
        DIAGNOSIS, 1268
    CIRRHOSIS
        DIAGNOSIS, 1228
    LIVER
        DIAGNOSIS, 1227, 1228
    NEOPLASMS, MALIGNANT
        DIAGNOSIS, 1189*
    PANCREAS DISEASE
        DIAGNOSIS, 1261
    PANCREATITIS
        DIAGNOSIS, 1189*

EDEMA
    GASTROINTESTINAL
        DIAGNOSIS, 1899
        FAMILIAL FACTORS, 1894

ELECTROLYTE
    STOMACH
        HISTAMINE, 1012
        SECRETION, 1016

ELECTROPHORESIS
    HEPATITIS, VIRAL
        TECHNIQUES, 1282
    PROTEASE
        TECHNIQUES, 1191*

EMBRYOLOGY
    ABSORPTION
        PROTEIN, 946*
    ANOMALIES, CONGENITAL
        ANORECTUM, 1553
    DUODENUM
        MORPHOLOGY, 921
        ULTRASTRUCTURE, 918*
    INTESTINE
        MORPHOLOGY, 929
    LIVER
        MORPHOLOGY, 937
    PYLORUS
        MORPHOLOGY, 921
    SMALL INTESTINE
        ABSORPTION, 946*

EMESIS
    SEE VOMITING

ENDOCRINE SYSTEM
    ACID SECRETION
        STOMACH, 1030
    HEPATITIS, CHRONIC
        DISEASES ASSOCIATED WITH, 1802
    LIVER DISEASE
        DISEASE ASSOCIATED WITH, 1694
    PANCREATITIS
        ETIOLOGY, 1664
    STOMACH
        GASTRITIS, 1340*
        ZOLLINGER-ELLISON SYNDROME, 1346*
    ZOLLINGER-ELLISON SYNDROME
        DISEASES ASSOCIATED WITH, 1346*

ENDOMETRIOSIS
    SIGMOID
        OBSTRUCTION, 1574
    SMALL INTESTINE
        OBSTRUCTION, 1454

ENDOSCOPY
    DUODENUM
        DIAGNOSIS, 1280, 1288
        TECHNIQUES, 1232, 1280
    ESOPHAGUS
        COMPLICATIONS, 1206
        DIAGNOSIS, 1329
        NEOPLASMS, MALIGNANT, 1215
    GASTROINTESTINAL
        BLEEDING, 1204
    PANCREAS
        DIAGNOSIS, 1253, 1288
    PANCREATIC DUCT
        STENOSIS, 1196*
    PANCREATITIS
        DIAGNOSIS, 1196*
    PEPTIC ULCER
        DIAGNOSIS, 1289
    RECTUM
        COMPLICATIONS, 1583
        NEOPLASMS, MALIGNANT, 1210
    SMALL INTESTINE
        DIAGNOSIS, 1256
    STOMACH
        COMPLICATIONS, 1206
        DIAGNOSIS, 1255, 1274, 1289, 1290, 1352
        NEOPLASMS, MALIGNANT, 1215

ENEMA
    COLON, 1550

ENTERITIS
    SEE ALSO REGIONAL ENTERITIS
    ESCHERICHIA COLI
        EPIDEMIOLOGY, 1909

ENTEROCOLITIS
    NEONATE, 1558
        RADIOLOGY, 1931
    RADIOLOGY
        CHILDREN, 1201

ENTEROPEPTIDASE
    SMALL INTESTINE
        MORPHOLOGY, 1155*

ENVIRONMENTAL FACTORS
    LIVER
        LIPIDS, 1092

ENZYMES
    BLOOD
        LIVER DISEASE, 1209
        PANCREAS DISEASE, 1209
    GASTROINTESTINAL
        DISEASES, 1903
    HEPATITIS, VIRAL
        DIAGNOSIS, 1285
    LIVER, 1124
        AGE FACTORS, 1111, 1181
        ALCOHOL, 1060*
        AMINO ACIDS, 1140
        CHEMICAL PROPERTIES, 1123
        CIRCADIAN RHYTHM, 1053*, 1129
        DIETARY FACTORS, 942, 1097, 1099, 1112, 1140
        DRUG EFFECTS ON, 1058*
        GLUCONEOGENESIS, 1117
        GLYCOLYSIS, 1117
        HEPATECTOMY, 1097
        HEPATITIS, VIRAL, 1285
        HORMONE CONTROL, 1111
        LIPIDS, 1110
        LYSOSOMES, 928
        MICROORGANISMS, 1181
        MITOCHONDRIA, 927, 1060*, 1125
        OBSTRUCTION, BILIARY TRACT, 919*
        PHYSICAL PROPERTIES, 1123
        REGENERATION, 1074, 1097
        ULTRASTRUCTURE, 1068

  - LIVER DISEASE
    - DIAGNOSIS, 1259, 1688, 1697, 1707
  - LIVER INJURY
    - CARBON TETRACHLORIDE, 1088, 1094
    - ULTRASTRUCTURE, 1094
  - PANCREAS, 1035*
    - DIAGNOSIS, 1229
    - MARKER STUDIES, 1184
    - REVIEWS, 1041
    - SECRETION, 1040
  - PROTEOLYTIC
    - PANCREATITIS, 1656
  - SMALL INTESTINE, 910*
    - ABSORPTION, 1156*
    - CHEMICAL PROPERTIES, 1156*, 1167
    - DIARRHEA, 1457
    - ISCHEMIA, 1448
    - MALNUTRITION, 1166
    - PHOSPHATASE, ALKALINE, 1157*
    - PHYTASE, 1157*
  - STOMACH
    - MUCOSA, 1014
    - PROSTAGLANDIN SYNTHETASE, 1005

- EPIDEMIOLOGY
  - CHOLECYSTITIS, 1859
  - CHOLELITHIASIS, 1859
  - CROHNS DISEASE, 1478, 1623
  - DIARRHEA, 1893
  - ENTERITIS
    - ESCHERICHIA COLI, 1909
  - ESOPHAGUS
    - NEOPLASMS, MALIGNANT, 1298, 1308
    - PERFORATION, 1293*
  - GALLBLADDER
    - NEOPLASMS, MALIGNANT, 1857
  - GASTRITIS
    - TECHNIQUES, 1354
  - GASTROENTERITIS, 1928
  - HEPATITIS, CHRONIC
    - ANTIGEN, AUSTRALIA, 1803
  - HEPATITIS, VIRAL
    - ANTIGEN, AUSTRALIA, 1211, 1768
    - DRUG ADDICTION, 1772
  - LACTASE DEFICIENCY, 1509, 1513
  - LACTOSE INTOLERANCE, 1509
    - REVIEWS, 1511
  - LIVER
    - AMEBIASIS, 1958
  - LIVER DISEASE, 1718
  - MALABSORPTION
    - DIETARY FACTORS, 1505
  - PANCREATITIS
    - ALCOHOL, 1665
  - STOMACH
    - DISEASES, 1352
    - NEOPLASMS, MALIGNANT, 1356
  - ULCERATIVE COLITIS, 1623

- ERYTHROCYTE
  - LIVER
    - MORPHOLOGY, 909*
  - METABOLISM
    - LIVER, 909*

- ESCHERICHIA COLI
  - DIARRHEA
    - ETIOLOGY, 1889
  - ENTERITIS
    - EPIDEMIOLOGY, 1909
  - JEJUNUM
    - SECRETION, 1153*
  - SMALL INTESTINE
    - SECRETION, 1153*

- ESOPHAGITIS
  - ESOPHAGUS
    - REFLUX, 1300

- ESOPHAGITIS, REFLUX
  - DIAGNOSIS, 1309
  - DISEASES ASSOCIATED WITH, 1311
    - HERNIA, HIATUS, 1307
    - NERVOUS SYSTEM, 1307
    - RESPIRATORY SYSTEM, 1309
  - DRUG TREATMENT, 1322
  - HERNIA, HIATUS
    - DISEASES ASSOCIATED WITH, 1302
  - SURGERY, 1309, 1311
    - COMPLICATIONS, 1307

- ESOPHAGUS
  - ABSCESS
    - ETIOLOGY, 1338
    - FOREIGN BODIES, 1338
    - SURVIVAL, 1338
  - ANOMALIES
    - DILATATION, 1319
    - SURGERY, 1319
  - ANOMALY, CONGENITAL
    - SURGERY, 1324
  - ATRESIA
    - DISEASES ASSOCIATED WITH, 1312
    - REVIEWS, 1299
  - BLEEDING
    - THERAPY, 1838
  - BURNS
    - CHILDREN, 1303
    - THERAPY, 1303
  - CALCIFICATION, 1317
  - DIAGNOSIS
    - ENDOSCOPY, 1329
    - PRESSURE STUDIES, 985
    - RADIOLOGY, 1325, 1329, 1331, 1338
    - REVIEWS, 1243
  - DILATATION
    - ACHALASIA, 1291*
  - DIVERTICULUM
    - ADOLESCENTS, 1305
    - CHILDREN, 1331
    - ETIOLOGY, 1325
    - SURGERY, 1325
  - ENDOSCOPY
    - COMPLICATIONS, 1206
  - FISTULA
    - HODGKINS DISEASE, 1306
  - FISTULAS
    - FOREIGN BODIES, 1337
  - FUNGUS INFECTION, 1329
  - MOTILITY
    - ACHALASIA, 1291*
    - CHOLINERGIC AGENTS, 978*
    - DEGLUTITION, 974*
    - HORMONE CONTROL, 978*
    - PENTAGASTRIN, 991
    - TECHNIQUES, 979*
  - MUCOSA
    - PROLAPSE, 1320

- NEOPLASMS
    - SURGERY, 1326
- NEOPLASMS, BENIGN
    - DISEASES ASSOCIATED WITH, 1317
    - NERVOUS SYSTEM, 1334
    - SURGERY, 1314
- NEOPLASMS, MALIGNANT
    - BLEEDING, 1296
    - DIETARY FACTORS, 1332
    - DYSPHAGIA, 1297
    - ENDOSCOPY, 1215
    - EPIDEMIOLOGY, 1298, 1308
    - ETIOLOGY, 1308, 1332
    - EXFOLIATIVE CYTOLOGY, 1215
    - RADIOTHERAPY, 1327
    - SURGERY, 1295, 1327, 1336
    - SURVIVAL, 1295
    - THERAPY, 1304
- PAIN
    - DRUG TREATMENT, 985
    - SURGERY, 985
- PERFORATION
    - EPIDEMIOLOGY, 1293*
    - NEOPLASMS, MALIGNANT, 1335
    - SURGERY, 1310, 1335
    - SURVIVAL, 1293*, 1335
- REFLUX
    - DIAGNOSIS, 1300
    - ESOPHAGITIS, 1300
    - HERNIA, HIATUS, 1300
- RUPTURE
    - COMPLICATIONS, 1294*
    - DIAGNOSIS, 1252
- STENOSIS
    - DILATATION, 1292*
    - DRUG TREATMENT, 1292*
    - SURGERY, 1316
- STRICTURE
    - DILATATION, 1315
- SURGERY
    - COMPLICATIONS, 1333
    - SURVIVAL, 1318, 1326, 1336
    - TECHNIQUES, 1326, 1336
    - TRANSPLANTATION, 1333
- TEMPERATURE
    - DIETARY FACTORS, 1321
- TRAUMA
    - SURGERY, 1310
- VARICES
    - BLEEDING, 1838

ESOPHAGUS DISEASES
- DISEASES ASSOCIATED WITH
    - MUSCULOSKELETAL SYSTEM, 1312
- FISTULA
    - DISEASES ASSOCIATED WITH, 1312

ETHNIC FACTORS
- CHOLECYSTITIS, 1850

EXFOLIATIVE CYTOLOGY
- ESOPHAGUS
    - NEOPLASMS, MALIGNANT, 1215
- STOMACH
    - NEOPLASMS, MALIGNANT, 1215

FAMILIAL FACTORS
- ABSORPTION
    - PROTEIN DEFICIENCY, 953
- COLON
    - POLYPS, 1576, 1592, 1598
- GASTROINTESTINAL
    - BLEEDING, 1944
    - EDEMA, 1894
    - POLYPS, 1562
- JAUNDICE
    - ETIOLOGY, 1730
- MALABSORPTION
    - VITAMIN B12, 1510
- RECTUM
    - PAIN, 1601
- ZOLLINGER-ELLISON SYNDROME, 1346*

FATS
- SEE LIPIDS, TRIGLYCERIDES

FATTY ACIDS
- BILIRUBIN
    - METABOLISM, 1729, 1732
- HEPATITIS, NONVIRAL
    - PREVENTION, 1752
- JEJUNUM
    - STASIS SYNDROME, 1485*
- LARGE INTESTINE, 1178
- LIVER
    - CHEMICAL COMPOSITION, 1106, 1108
    - DIETARY FACTORS, 1079, 1112
    - NEONATE, 1106
    - SYNTHESIS, 1079

FATTY LIVER
- BILE ACIDS
    - METABOLISM, 1816
- CARBOHYDRATE
    - METABOLISM, 1747
- DIABETES
    - DISEASES ASSOCIATED WITH, 1747
- ETIOLOGY, 1078
    - ANTIBIOTICS, 1051*
    - PROTEIN DEFICIENCY, 1072
- LIPIDS
    - METABOLISM, 1816
- PREVENTION
    - DRUGS, 1121

FECES
- ACIDITY, 945*
- BILE ACIDS
    - ILEUM DISEASE, 1449
- LEUKOCYTES
    - DISEASES ASSOCIATED WITH, 1902
- LIPIDS
    - ILEUM DISEASE, 1449

FIBRINOLYSIS
- LIVER
    - DIALYSIS, 1090, 1139

FIBROSIS
- LIVER INJURY
    - CARBON TETRACHLORIDE, 913*
- SCHISTOSOMIASIS
    - DISEASES ASSOCIATED WITH, 1969
    - LIVER, 1967
    - PORTAL HYPERTENSION, 1969

FISSURE
- ANUS

        SURGERY, 1602

FISTULA
    COLON
        DIVERTICULUM, 1534
    ESOPHAGUS
        HODGKINS DISEASE, 1306
    ESOPHAGUS DISEASES
        DISEASES ASSOCIATED WITH, 1312
    STOMACH
        DIAGNOSIS, 1358
        SURGERY, 1358

FISTULAS
    BILIARY TRACT, 1852
    ESOPHAGUS
        FOREIGN BODIES, 1337

FLATULENCE
    DYSPEPSIA
        CHOLELITHIASIS, 1849

FLORA
    LARGE INTESTINE
        CROHNS DISEASE, 1470*
    SMALL INTESTINE
        CROHNS DISEASE, 1470*
        VAGOTOMY, 1384*

FOLIC ACID
    MALABSORPTION
        BLIND LOOP SYNDROME, 954

FOOD POISONING
    ETIOLOGY, 1159
    ILEUM
        SIMULATION, 1159

FOREIGN BODIES
    ESOPHAGUS
        ABSCESS, 1338
        FISTULAS, 1337
    SMALL INTESTINE
        PERFORATION, 1466
        SURGERY, 1466
    STOMACH
        VOMITING, 1360

FUNGUS INFECTION
    ESOPHAGUS, 1329
    LIVER
        ABSCESS, 1750

GALACTOSAMINE
    LIVER INJURY
        DRUG EFFECTS ON, 1067*

GALACTOSE
    ABSORPTION
        DIABETES, 952
    SMALL INTESTINE
        ABSORPTION, 952

GALLBLADDER
    ANOMALY, CONGENITAL, 1855
    DISEASES
        SEX FACTORS, 1859
        SURVIVAL, 1859
    DIVERTICULUM, 1871
    NEOPLASMS, BENIGN, 1847
    NEOPLASMS, MALIGNANT, 1880
        ANGIOGRAPHY, 1879
        EPIDEMIOLOGY, 1857
        SURVIVAL, 1857, 1867
    RADIOLOGY
        HORMONE, 1193*
    RUPTURE
        CHILDREN, 1865

GALLBLADDER DISEASE
    DUODENUM
        RADIOLOGY, 1239

GARDNERS SYNDROME
    COLON, 1540

GAS
    COLON, 1577
    INTESTINE, 1897
    LIVER
        CIRCULATION, 1455

GAS, INTESTINAL
    DRUG EFFECTS ON
        ANTIBIOTICS, 1936

GASTRECTOMY
    SEE ALSO ANTRECTOMY
    COMPLICATIONS
        CIRCULATION, 1376
    DISEASES ASSOCIATED WITH
        ANEMIA, PERNICIOUS, 1163
    SEQUELAE
        LACTASE DEFICIENCY, 1495
        LACTOSE INTOLERANCE, 1495
    STOMACH
        CHEMICAL BURNS, 1378
        NECROSIS, 1378

GASTRIC
    ZOLLINGER-ELLISON SYNDROME
        BLOOD, 1885*

GASTRIN
    BLOOD
        CIRCADIAN RHYTHM, 1002*
        DIETARY FACTORS, 1019
        HORMONE EFFECTS ON, 1892
        HYPOGLYCEMIA, 1001*, 1019
        PEPTIC ULCER, 1001*, 1002*
        VAGOTOMY, 1001*, 1009
        ZOLLINGER-ELLISON SYNDROME, 1892
    HYPOGLYCEMIA, 1387*
        PEPTIC ULCER, 1390*
    METABOLISM, 1003
    NERVOUS CONTROL, 1387*
    PANCREAS
        NEOPLASMS, 1639
    PEPTIC ULCER
        IMMUNOLOGY, 1397
        SURGERY, 1417
    REVIEWS, 1020
    SERUM
        NERVOUS CONTROL, 1390*
    STOMACH
        ACID SECRETION, 1344*, 1394*
    ULCER
        DUODENUM, 1397

- ULCER, DUODENUM
    - PYLOROPLASTY, 1394*
    - VAGOTOMY, 1394*
- ZOLLINGER-ELLISON SYNDROME
    - DIAGNOSIS, 1397

GASTRITIS
- DIAGNOSIS
    - PROTEASE, 1191*
    - RADIOLOGY, 1348
- DISEASES ASSOCIATED WITH
    - NEOPLASMS, MALIGNANT, 1349
- EPIDEMIOLOGY
    - TECHNIQUES, 1354
- ETIOLOGY
    - IMMUNOLOGY, 1396
    - SURGERY, 1408
- IMMUNOLOGY, 1362
- PEPTIC ULCER
    - DISEASES ASSOCIATED WITH, 1391*
    - SURGERY, 1396
- STOMACH
    - ACID SECRETION, 1391*
    - BIOPSY, 1275
    - ENDOCRINE SYSTEM, 1340*
- ULCER
    - DISEASES ASSOCIATED WITH, 1391*

GASTROENTERITIS
- EPIDEMIOLOGY, 1928
- ETIOLOGY
    - BACTERIA, 1177
    - REVIEWS, 1926
- NEONATE, 1889
- SEX FACTORS, 1928

GASTROINTESTINAL
- ANOMALY
    - CONGENITAL, 1960
    - DISEASES ASSOCIATED WITH, 1915
    - DOWNS SYNDROME, 1947
    - DRUG-INDUCED, 1927
- BLEEDING
    - ANGIOGRAPHY, 1937, 1944
    - CHILDREN, 1940
    - DIAGNOSIS, 1939
    - DISEASES ASSOCIATED WITH, 1939
    - DRUG TREATMENT, 1884*
    - ENDOSCOPY, 1204
    - ETIOLOGY, 1938, 1948
    - FAMILIAL FACTORS, 1944
    - MORTALITY, 1939
    - SEPSIS, 1938
    - SURVIVAL, 1941
    - TREATMENT, 1938
    - VASOCONSTRICTORS, 1884*, 1937
- CIRCULATION
    - DRUG EFFECTS ON, 1891
- DIAGNOSIS
    - RADIOISOTOPES, 1286
    - RADIOLOGY, 990, 1894
    - REVIEWS, 1286
- DISEASE
    - ANGIOGRAPHY, 1213
    - MALABSORPTION, 1512
- DISEASES
    - ALLERGY, 1911
    - DIET, 1896
    - ENZYMES, 1903
    - HORMONE EFFECTS ON, 1943
    - LYMPHATICS, 1913
- EDEMA
    - DIAGNOSIS, 1899
    - FAMILIAL FACTORS, 1894
- HORMONE
    - REVIEWS, 1943
- HORMONE CONTROL
    - REVIEWS, 1175
- MORPHOLOGY
    - ASCARIASIS, 1955
    - HORMONE CONTROL, 1175
- MOTILITY
    - CORTICOSTEROIDS, 988
    - DIAGNOSIS, 990
    - HORMONE FACTORS, 988
    - SIMULATION, 989
- NEOPLASMS
    - DISEASES ASSOCIATED WITH, 1908
- NEOPLASMS, MALIGNANT, 1895
    - ANTIGEN, 1886*, 1945
    - CYTOLOGY, 1173*
    - DIAGNOSIS, 1886*
    - IMMUNOLOGY, 1173*
    - REVIEWS, 1888, 1895
- POLYPS
    - FAMILIAL FACTORS, 1562
    - PROTEIN-LOSING ENTEROPATHY, 1491
- SECRETION
    - HORMONE CONTROL, 1175
- ULCER
    - VIRUS INFECTION, 1907
- ULCERS
    - ASCARIASIS, 1955

GIARDIASIS
- BLOOD
    - IMMUNOGLOBULINS, 1949*
- CHILDREN
    - MALABSORPTION, 1962
- DIARRHEA
    - ETIOLOGY, 1961
- DISEASES ASSOCIATED WITH
    - MALABSORPTION, 1962
- REVIEWS, 1961
- SMALL INTESTINE
    - IMMUNOGLOBULINS, 1949*

GILBERTS DISEASE
- LIVER FUNCTION TESTS
    - BROMOSULFOPHTHALEIN, 1725*

GLUCAGON
- DUODENUM
    - MOTILITY, 975*
- LIVER
    - GLUCONEOGENESIS, 1056*
    - METABOLISM, 1144
    - ULTRASTRUCTURE, 1144
- PANCREATITIS
    - THERAPY, 1667
- STOMACH
    - ACID SECRETION, 1017

GLUCONEOGENESIS
- LIVER
    - AGE FACTORS, 1127
    - AMINO ACIDS, 1137
    - DIABETES, 1056*

    - DIETARY FACTORS, 1056*, 1117
    - ENZYMES, 1117
    - GLUCAGON, 1056*

- GLUCOSE
  - ABSORPTION
    - JEJUNUM, 968
    - SMALL INTESTINE, 951, 962
  - TRANSPORT
    - HORMONE CONTROL, 969
    - OXYGEN, 969
    - SMALL INTESTINE, 969

- GLUCOSE-6-PHOSPHATE DEHYDROGENASE
  - LIVER
    - ISOENZYMES, 1126
    - PHYSICAL PROPERTIES, 1126
  - LIVER INJURY
    - CARBON TETRACHLORIDE, 1095
  - DEFICIENCY
    - JAUNDICE, 1730
  - ISOENZYMES
    - LIVER, 1095

- GLUCOSE TOLERANCE
  - CIRRHOSIS
    - PORTACAVAL SHUNT, 1817*

- GLUTEN
  - CELIAC DISEASE
    - IMMUNOLOGY, 1496
  - SMALL INTESTINE
    - IMMUNOLOGY, 1488*
    - MORPHOLOGY, 1501

- GLYCOGEN
  - LIVER
    - CORI DISEASE, 1709
  - METABOLISM
    - DIETARY FACTORS, 1070
    - LIVER, 1070

- GLYCOGENOLYSIS
  - LIVER
    - NERVOUS CONTROL, 1143

- GLYCOLYSIS
  - LIVER
    - AGE FACTORS, 1127
    - ENZYMES, 1117

- GLYCOPROTEINS
  - JEJUNUM
    - MORPHOLOGY, 916*
    - ULTRASTRUCTURE, 916*

- HAMARTOMA
  - STOMACH, 1355

- HEALING
  - PERITONEUM, 1930
  - STOMACH
    - POLYPS, 1368

- HEIDENHAIN POUCH
  - ION TRANSPORT
    - STOMACH, 949*

- HEMATOLOGY
  - LIVER
    - DIALYSIS, 1149

- HEMATOMA
  - DUODENUM, 1440
  - LIVER
    - SCANNING, SCINTILLATION, 1263

- HEMMORHOIDS
  - ANESTHESIA, 1596
  - STEROIDS, 1596

- HEMOBILIA
  - BILIARY TRACT
    - TRAUMA, 1870

- HEMORRHAGE
  - SEE BLEEDING

- HEMOSIDEROSIS
  - PORTACAVAL SHUNT
    - SEQUELAE, 1823

- HEPARIN
  - LIVER
    - LYSOSOMES, 1152

- HEPATECTOMY
  - LIVER
    - ENZYMES, 1097

- HEPATITIS
  - ANTIGEN, AUSTRALIA
    - REVIEWS, 1785
  - DISEASES ASSOCIATED WITH
    - PANCREAS DISEASE, 1770
    - SYPHILIS, 1740*
  - LIVER DISEASE, ALCOHOLIC, 1805*
  - TRANSMISSION
    - TRANSFUSION, 1780
  - TREATMENT
    - TRANSFUSION, 1686

- HEPATITIS, CHRONIC
  - ANTIGEN, AUSTRALIA
    - MICROSCOPY, 1762*
  - BILIARY TRACT
    - MORPHOLOGY, 1793*
  - CARBOHYDRATE
    - METABOLISM, 1802
  - CLOTTING
    - DRUG TREATMENT, 1804
  - DISEASES ASSOCIATED WITH, 1796*
    - ALLERGY, 1804
    - COLLAGEN DISEASES, 1795*
    - ENDOCRINE SYSTEM, 1802
  - DRUG TREATMENT
    - CORTICOSTEROIDS, 1802
  - EPIDEMIOLOGY
    - ANTIGEN, AUSTRALIA, 1803
  - ETIOLOGY
    - LAXATIVES, 1737*
  - IMMUNOGLOBULINS
    - ANTIBODIES, 1800
  - IMMUNOLOGY, 1797*, 1798*
    - DRUG TREATMENT, 1796*
  - IMMUNOSUPPRESSION, 1794*, 1801

- HEPATITIS, NONVIRAL

- ANTIBACTERIALS, 1742
- DRUG TOXICITY
  - ANTIBACTERIALS, 1745
  - CATECHOLAMINES, 1744
  - REVIEWS, 1753
- IMMUNOSUPPRESSION, 1739*
- KIDNEY
  - DIALYSIS, 1738*
- PREVENTION
  - FATTY ACIDS, 1752

EPATITIS, SERUM
- IMMUNOLOGY
  - ANTIGEN, AUSTRALIA, 1777
- TRANSMISSION
  - BLOOD, 1779
  - TRANSFUSION, 1776

EPATITIS, VIRAL
- ANTIGEN, AUSTRALIA
  - ANTIBODIES, 1792
  - EPIDEMIOLOGY, 1768
  - MICROSCOPY, 1762*
  - TECHNIQUES, 1262
- BLOOD
  - CLOTTING, 1756*
- COPPER
  - METABOLISM, 1769
- DIAGNOSIS
  - ANTIGEN, AUSTRALIA, 1282
  - ENZYMES, 1285
- DISEASE ASSOCIATED WITH
  - UROGENITAL SYSTEM, 1788
- DISEASES ASSOCIATED WITH
  - MUSCULOSKELETAL SYSTEM, 1765, 1789
  - NERVOUS SYSTEM, 1781
- EPIDEMIOLOGY
  - ANTIGEN, AUSTRALIA, 1211
  - DRUG ADDICTION, 1772
- ETIOLOGY
  - ANTIGEN, AUSTRALIA, 1764*
  - DRUG ADDICTION, 1766
- IMMUNOLOGY, 1120
  - ANTIGEN, AUSTRALIA, 1755*, 1758*, 1759*, 1790
  - COMPLEMENT, 1784
  - MICROSCOPY, 1759*
  - TRANSMISSION, 1758*
- LIPIDS
  - CHILDREN, 1782
- LIVER
  - ENZYMES, 1285
- PREGNANCY, 1791
- REVIEWS, 1783
- SEDATIVES
  - METABOLISM, 1778
- TECHNIQUES
  - ELECTROPHORESIS, 1282
- TRANSMISSION
  - BLOOD, 1763*
  - CHILDREN, 1775
- TREATMENT
  - TRANSFUSION, 1767
- VIROLOGY, 1120
- VITAMIN B12
  - BINDING, 1761*

HEPATOMEGALY
- ETIOLOGY
  - ANTIHORMONES, 1115

HEREDITARY FACTORS
- LIVER
  - PROTEIN, 1087

HERNIA
- LIVER, 1683

HERNIA, HIATUS
- DIAGNOSIS, 1339
- DISEASES ASSOCIATED WITH, 1319
  - ESOPHAGITIS, REFLUX, 1302
  - RADIOLOGY, 1320
- ESOPHAGITIS, REFLUX
  - DISEASES ASSOCIATED WITH, 1307
- ESOPHAGUS
  - REFLUX, 1300
- SURGERY, 1302, 1323
  - COMPLICATIONS, 1339
  - TECHNIQUES, 1339

HIRSCHSPRUNGS DISEASE
- AGE FACTORS, 1597
- DIAGNOSIS
  - PRESSURE STUDIES, 1188*
- NEONATE, 1590
- SURGERY, 1533, 1597

HISTAMINE
- STOMACH
  - ACID SECRETION, 1012
  - ELECTROLYTE, 1012
  - PEPSIN, 1012

HODGKINS DISEASE
- ESOPHAGUS
  - FISTULA, 1306

HORMONE
- GALLBLADDER
  - RADIOLOGY, 1193*
- GASTROINTESTINAL
  - REVIEWS, 1943
- METABOLISM
  - LIVER, 1075
- SMALL INTESTINE
  - RADIOLOGY, 1192*

HORMONE CONTROL
- BILE
  - TRIGLYCERIDE, 1130
- BILIRUBIN
  - METABOLISM, 1054*
  - TRANSPORT, 1054*
- ESOPHAGUS
  - MOTILITY, 978*
- GASTROINTESTINAL
  - MORPHOLOGY, 1175
  - REVIEWS, 1175
  - SECRETION, 1175
- LIVER
  - ENZYMES, 1111
  - ION TRANSPORT, 960
  - REGENERATION, 1059*
- PANCREAS
  - SECRETION, 1039, 1635, 1643

  PEPTIC ULCER
    ACID SECRETION, 999*
  PYLOROPLASTY
    SECRETION, 1423
  SMALL INTESTINE
    MOTILITY, 973*, 980*
  STOMACH
    ACID SECRETION, 1029
    SECRETION, 1000*
  TRANSPORT
    GLUCOSE, 969
  VAGOTOMY
    SECRETION, 1423
  ZOLLINGER-ELLISON SYNDROME
    ACID SECRETION, 999*

HORMONE EFFECTS ON
  BLOOD
    GASTRIN, 1892
  GASTROINTESTINAL
    DISEASES, 1943
  LIVER, 1714
  PANCREAS
    SECRETION, 1395*
  SECRETION
    PANCREAS, 1013
    STOMACH, 1013

HORMONE FACTORS
  GASTROINTESTINAL
    MOTILITY, 988

HORMONES
  ACID SECRETION
    STOMACH, 1023, 1030
  ILEUS
    DRUG TREATMENT, 1431*
  LIVER
    CHEMICAL COMPOSITION, 1115
    ULTRASTRUCTURE, 1115
  PEPSIN
    STOMACH, 1023
  PEPTIC ULCER
    DRUG TREATMENT, 995*
  STOMACH
    ACID SECRETION, 995*, 1006, 1025, 1026
    BIOPOTENTIALS, 1025
    MOTILITY, 1025
    PEPSIN, 996*
    SECRETION, 996*

HYPERBILIRUBINEMIA
  CARBOHYDRATE
    METABOLISM, 1734
  DIETARY FACTORS, 1086
  NEONATE
    DRUG TREATMENT, 1734
    SEDATIVES, 1736
  PHOTOTHERAPY, 1731
  PREVENTION
    DRUGS, 1727*
    NEONATE, 1728*
    SEDATIVES, 1728*

HYPERCHLORHYDRIA
  SEE ALSO ACID SECRETION
  DRUG TREATMENT, 1017
    ANTICHOLINERGIC AGENTS, 1382
    TRANQUILIZERS, 1382

HYPERGLYCEMIA
  LIVER
    NERVOUS CONTROL, 1143

HYPERLIPEMIA
  ETIOLOGY
    LIVER DISEASE, ALCOHOLIC, 1757*

HYPEROXIA
  LIVER
    PHOSPHATASE, ACID, 1105

HYPOCHLORHYDRIA
  SEE ALSO ACID SECRETION

HYPOGLYCEMIA
  BLOOD
    GASTRIN, 1001*, 1019
  GASTRIN, 1387*
    PEPTIC ULCER, 1390*
  STOMACH
    ACID SECRETION, 1018, 1019, 1031

ICTERUS
  SEE JAUNDICE

ILEOSTOMY
  BILE ACIDS
    METABOLISM, 1518*

ILEUM
  SEE ALSO SMALL INTESTINE
  DILATATION
    CROHNS DISEASE, 1475
  FOOD POISONING
    SIMULATION, 1159
  MICROORGANISMS
    BILE ACIDS, 1160
  MOTILITY, 982*
  PERISTALSIS
    DRUG EFFECTS ON, 992
  ULTRASTRUCTURE
    CROHNS DISEASE, 1481

ILEUM DISEASE
  FECES
    BILE ACIDS, 1449
    LIPIDS, 1449

ILEUS
  CHOLELITHIASIS
    DISEASES ASSOCIATED WITH, 1572
    REVIEWS, 1863
  DIAGNOSIS
    RADIOLOGY, 1205
  DRUG TREATMENT
    HORMONES, 1431*
  ETIOLOGY, 1462
    CHOLELITHIASIS, 1464
  LARGE INTESTINE
    NEOPLASMS, MALIGNANT, 1572
  PARASITES AND PARISITIC DISEASES
    DISEASES ASSOCIATED WITH, 1966
  THERAPY
    SURVIVAL, 1966

IMMUNOGLOBULINS

- ANTIBODIES
  - CIRRHOSIS, 1800
  - HEPATITIS, CHRONIC, 1800
- BLOOD
  - GIARDIASIS, 1949*
- DEFICIENCY
  - DISEASES ASSOCIATED WITH, 1480
- MALABSORPTION, 1506
- SMALL INTESTINE
  - GIARDIASIS, 1949*

MMUNOLOGY
- ANEMIA, PERNICIOUS, 1015
- ANTIGEN, AUSTRALIA
  - MICROSCOPY, 1773
- GASTROINTESTINAL
  - NEOPLASMS, MALIGNANT, 1934
- CELIAC DISEASE, 1484*
  - DIAGNOSIS, 1626
  - GLUTEN, 1496
- CHOLECYSTITIS
  - MORPHOLOGY, 1866
- CIRRHOSIS, 1796*, 1798*
- COLON
  - NEOPLASMS, MALIGNANT, 1526*, 1905
  - ULCERATIVE COLITIS, 1617
- CROHNS DISEASE, 1472, 1481
  - DIAGNOSIS, 1626
  - SURGERY, 1616*
- ECHINOCOCCOSIS
  - DIAGNOSIS, 1952
- GASTRITIS, 1362
  - ETIOLOGY, 1396
- GASTROINTESTINAL
  - NEOPLASMS, MALIGNANT, 1173*
- HEPATITIS, CHRONIC, 1797*, 1798*
  - DRUG TREATMENT, 1796*
- HEPATITIS, SERUM
  - ANTIGEN, AUSTRALIA, 1777
- HEPATITIS, VIRAL, 1120
  - ANTIGEN, AUSTRALIA, 1755*, 1758*, 1759*, 1790
  - COMPLEMENT, 1784
  - MICROSCOPY, 1759*
  - TRANSMISSION, 1758*
- LARGE INTESTINE
  - INFLAMMATION, 1527*
  - NEOPLASMS, MALIGNANT, 1519*
- LIVER DISEASE, 1692, 1693
- LIVER INJURY, 1076
- PANCREATITIS, 1362
- PEPTIC ULCER
  - GASTRIN, 1397
- RECTUM
  - NEOPLASMS, MALIGNANT, 1905
- SMALL INTESTINE
  - CELIAC DISEASE, 1488*
  - GLUTEN, 1488*
  - SPECIES DIFFERENCES, 963
  - STRONGYLOIDIASIS, 932
- STOMACH
  - NEOPLASMS, MALIGNANT, 1375
- ULCERATIVE COLITIS
  - DIAGNOSIS, 1626
  - SURGERY, 1616*

MMUNOSUPPRESSION
- CIRRHOSIS, 1794*
- CROHNS DISEASE
  - LARGE INTESTINE, 1584
- HEPATITIS, CHRONIC, 1794*, 1801
- HEPATITIS, NONVIRAL, 1739*
- LIVER
  - TRANSPLANTATION, 1104, 1706
- ULCERATIVE COLITIS, 1625
  - CHILDREN, 1620

INCONTINENCE
- ANUS
  - SURGERY, 1538

INFARCTION
- LARGE INTESTINE
  - ISCHEMIA, 1932

INFLAMMATION
- COLON
  - DIAGNOSIS, 1531
- INTESTINE
  - PARASITES AND PARASITIC DISEASES, 1950*
- LARGE INTESTINE
  - IMMUNOLOGY, 1527*

INJURY
- LARGE INTESTINE
  - RADIATION, 1439
- LIVER
  - ANESTHETICS, 1118
  - ANTIBACTERIALS, 1721
  - ANTIBIOTICS, 1705
  - CARBON TETRACHLORIDE, 1114, 1142
  - MORPHOLOGY, 1118
  - NAPHTHYLISOTHIOCYANATE, ALPHA, 1109
  - PREVENTION, 1114
  - ZINC, 1114
- SMALL INTESTINE
  - RADIATION, 1439

INSECTICIDES
- LIVER
  - NUCLEIC ACIDS, 938

INSULIN
- PANCREAS
  - SECRETION, 1044
- STOMACH
  - ACID SECRETION, 1031, 1245, 1248

INTESTINE
- SEE ALSO SMALL INTESTINE
- BILIRUBIN
  - METABOLISM, 1057*
- DISACCHARIDASE
  - TECHNIQUES, 1447
- GAS, 1897
- INFLAMMATION
  - PARASITES AND PARASITIC DISEASES, 1950*
- LYMPHANGIECTASIA
  - ANOMALY, CONGENITAL, 1507
  - DISEASES ASSOCIATED WITH, 1490
- LYMPHATICS
  - TECHNIQUES, 1185
- MORPHOLOGY
  - EMBRYOLOGY, 929
  - NERVOUS SYSTEM, 929

- RADIATION, 941
- MOTILITY
  - MARKER STUDIES, 1184
- OBSTRUCTION
  - ETIOLOGY, 1462
  - RADIOLOGY, 1205
  - REVIEWS, 1461
- RADIATION
  - CELL SURVIVAL, 941
- VOLVULUS, 1545

INTOLERANCE
- LACTOSE
  - RADIOLOGY, 1458

INTUSSUSCEPTION
- CECUM, 1612

IODINE
- SMALL INTESTINE
  - LYMPH, 1169

ION EFFECTS ON
- COLON
  - BIOPOTENTIALS, 987
  - MOTILITY, 987

ION TRANSPORT
- BILE
  - SECRETION, 1147
- DIARRHEA
  - ETIOLOGY, 1916
- LIVER
  - CALCIUM, 960
  - CELLS, 971
  - HORMONE CONTROL, 960
  - MAGNESIUM, 960
  - MITOCHONDRIA, 966
  - SIMULATION, 971
- SMALL INTESTINE
  - DIARRHEA, 1887*
- STOMACH
  - BIOPOTENTIALS, 961
  - HEIDENHAIN POUCH, 949*

IRON
- ABSORPTION
  - PANCREATITIS, 1672
- DIETARY FACTORS
  - DYSPHAGIA, 1301
- LIVER
  - DRUG METABOLISM, 1151
  - ULTRASTRUCTURE, 1063*
- METABOLISM
  - DRUG EFFECTS ON, 1065*
  - LIVER, 1062*, 1063*, 1065*
- SMALL INTESTINE
  - ABSORPTION, 910*

IRRITABLE COLON
- LACTASE DEFICIENCY, 1521*
- LACTOSE INTOLERANCE, 1521*

ISCHEMIA
- COLITIS
  - ANGIOGRAPHY, 1543
  - CIRCULATION, 1543
- LARGE INTESTINE
  - DIAGNOSIS, 1528, 1932
  - INFARCTION, 1932
  - RADIOLOGY, 1528
  - SURVIVAL, 1932
- PROCTOCOLITIS
  - ETIOLOGY, 1615*
- SMALL INTESTINE
  - ENZYMES, 1448
  - OXYGEN, 1448

ISOENZYMES
- GLUCOSE-6-PHOSPHATE DEHYDROGENASE
  - LIVER, 1095
- LACTATE DEHYDROGENASE
  - RADIATION, 1089
- LIVER
  - GLUCOSE-6-PHOSPHATE DEHYDROGENASE, 1126

ISOLATION
- LIVER
  - RIBOSOMES, 922

JAUNDICE
- DIAGNOSIS
  - ANGIOGRAPHY, 1250
  - CHILDREN, 1260
  - LIVER FUNCTION TESTS, 1222
  - NEONATE, 1260
  - RADIOLOGY, 1222
- ETIOLOGY, 1250
  - FAMILIAL FACTORS, 1730
- GLUCOSE-6-PHOSPHATE DEHYDROGENASE
  - DEFICIENCY, 1730
- NEONATE
  - ETIOLOGY, 1732
  - NARCOTICS, 1735

JAUNDICE, OBSTRUCTION
- DIAGNOSIS
  - MARKER STUDIES, 1198

JAUNDICE, OBSTRUCTIVE
- BLOOD VOLUME, 1103
- DIAGNOSIS, 1208
  - ANGIOGRAPHY, 1250
  - RADIOLOGY, 1220
- LIVER
  - CIRCULATION, 1179
- SURGERY, 1860

JEJUNUM
- SEE ALSO SMALL INTESTINE
- ABSORPTION
  - AMINO ACIDS, 968
  - GLUCOSE, 968
- CIRCULATION
  - SHOCK, 1923
- DISTENSION
  - DUMPING SYNDROME, 1436
- DUMPING SYNDROME
  - CIRCULATION, 1436
- FATTY ACIDS
  - STASIS SYNDROME, 1485*
- MORPHOLOGY
  - GLYCOPROTEINS, 916*
  - SHOCK, 1923
- SECRETION
  - ESCHERICHIA COLI, 1153*
- ULTRASTRUCTURE

    - GLYCOPROTEINS, 916*

- ININ
  - METABOLISM
    - LARGE INTESTINE, 1162
    - SPECIES DIFFERENCES, 1162

- WASHIORKOR
  - ANEMIA
    - ETIOLOGY, 1946
  - BILE ACIDS
    - METABOLISM, 1489
  - DIAGNOSIS
    - TRANSFERRIN, 1946
  - DISEASES ASSOCIATED WITH
    - LIVER DISEASE, 1494
  - RENIN, 1494

- ACTASE
  - SEE ALSO DISACCHARIDASE

- ACTASE DEFICIENCY
  - EPIDEMIOLOGY, 1509, 1513
  - GASTRECTOMY
    - SEQUELAE, 1495
  - IRRITABLE COLON, 1521*

- ACTATE DEHYDROGENASE
  - ISOENZYMES
    - RADIATION, 1089
  - LIVER
    - RADIATION, 1089
  - STOMACH
    - NEOPLASMS, MALIGNANT, 1194*
    - SECRETION, 1194*

- ACTOSE
  - INTOLERANCE
    - RADIOLOGY, 1458
  - SMALL INTESTINE
    - ABSORPTION, 1450

- ACTOSE INTOLERANCE
  - DIARRHEA, 1492
  - EPIDEMIOLOGY, 1509
    - REVIEWS, 1511
  - GASTRECTOMY
    - SEQUELAE, 1495
  - IRRITABLE COLON, 1521*
  - SMALL INTESTINE
    - PEPTIC ULCER SURGERY, 1450

- AMBLIASIS
  - SEE GIARDIASIS

- ARGE INTESTINE
  - SEE ALSO INTESTINE, APPENDIX, CECUM, COLON, RECTUM, ANUS, SIGMOID
  - ABSORPTION, 972
    - PHOSPHORUS, 956
    - URINE, 970
  - AMINO ACIDS
    - METABOLISM, 1165
  - AMYLOIDOSIS, 1904
  - ANOMALY, CONGENITAL, 1556
  - ANTIBIOTICS, 1522*
  - CROHNS DISEASE
    - IMMUNOSUPPRESSION, 1584
    - THERAPY, 1582
  - DIAGNOSIS
    - BIOPSY, 1207
  - DIVERTICULITIS
    - DIET, 1571
  - DIVERTICULUM
    - BLEEDING, 1600
    - DIET, 1571
  - ENDOMETROSIS, 1520*
  - FATTY ACIDS, 1178
  - FLORA
    - CROHNS DISEASE, 1470*
  - INFLAMMATION
    - IMMUNOLOGY, 1527*
  - INJURY
    - RADIATION, 1439
  - ISCHEMIA
    - DIAGNOSIS, 1528, 1932
    - INFARCTION, 1932
    - RADIOLOGY, 1528
    - SURVIVAL, 1932
  - KININ
    - METABOLISM, 1162
  - MOTILITY, 983, 1548
  - NECROSIS
    - ETIOLOGY, 1561
  - NEOPLASMS, BENIGN
    - NERVOUS SYSTEM, 1555
  - NEOPLASMS, MALIGNANT, 1524*
    - AGE FACTORS, 1581
    - BIOPSY, 1517*
    - DIAGNOSIS, 1519*
    - DISEASES ASSOCIATED WITH, 1562
    - ILEUS, 1572
    - IMMUNOLOGY, 1519*
    - PHOSPHATASE, ALKALINE, 1549
    - SURGERY, 1536
    - TISSUE CULTURE, 1517*
  - OBSTRUCTION
    - REVIEWS, 1532
  - POLYPS
    - BIOPSY, 1517*
    - JUVENILE, 1535
    - REVIEWS, 1605
    - SURGERY, 1588
    - THERAPY, 1570
    - TISSUE CULTURE, 1517*
  - RADIOLOGY, 1529
  - REVIEWS, 1579
  - SURGERY, 1537, 1542
    - ANTIBIOTICS, 1530
  - TRANSPLANTATION
    - COMPLICATIONS, 1318
    - RADIOLOGY, 1316
  - TRAUMA
    - ETIOLOGY, 1557
  - VOLVULUS, 1563

- LAXATIVES
  - BILE
    - SECRETION, 1743
  - CIRRHOSIS
    - ETIOLOGY, 1737*
  - CONSTIPATION
    - COMPLICATIONS, 1914
  - HEPATITIS, CHRONIC
    - ETIOLOGY, 1737*

- LEPROSY
  - LIVER

- MORPHOLOGY, 1748

- LEUKOCYTES
  - FECES
    - DISEASES ASSOCIATED WITH, 1902

- LIPASE
  - BLOOD
    - PANCREATITIS, 1667
  - LYMPH
    - PANCREATITIS, 1659
  - PANCREAS
    - LIVER DISEASE, ALCOHOLIC, 1486*
  - PANCREAS DISEASE
    - DIAGNOSIS, 1269

- LIPID
  - MALABSORPTION
    - LIVER DISEASE, 1487*
  - METABOLISM
    - LIVER, 1110, 1125

- LIPIDS
  - BLOOD
    - LIVER DISEASE, 1715
  - FECES
    - ILEUM DISEASE, 1449
  - HEPATITIS, VIRAL
    - CHILDREN, 1782
  - LIVER
    - CHEMICAL COMPOSITION, 1108
    - DIETARY FACTORS, 1078, 1092, 1112
    - ENVIRONMENTAL FACTORS, 1092
    - ENZYMES, 1110
    - SPECIES DIFFERENCES, 1112
    - ULTRASTRUCTURE, 1110
    - VITAMIN E, 1142
  - MALABSORPTION
    - ETIOLOGY, 1441
  - METABOLISM
    - FATTY LIVER, 1816
  - SMALL INTESTINE
    - METABOLISM, 912*

- LIPOPROTEINS
  - BLOOD
    - LIVER DISEASE, 1720
  - LIVER
    - METABOLISM, 1134

- LIVER
  - ABSCESS, 1687
    - AMEBIASIS, 1968
    - BACTERIA, 1746
    - COMPLICATIONS, 1968
    - ECHINOCOCCOSIS, 1952
    - FUNGUS INFECTION, 1750
    - RADIOLOGY, 1236
    - SALMONELLOSIS, 1749
    - SCANNING, SCINTILLATION, 1236
    - SEX FACTORS, 1968
  - ABSORPTION
    - TRIGLYCERIDES, 915*
  - AMEBIASIS
    - DIAGNOSIS, 1960
    - DRUG TREATMENT, 1957
    - EPIDEMIOLOGY, 1958
    - LIVER FUNCTION TESTS, 1957
  - AMINO ACIDS
    - AGE FACTORS, 1055*
    - DIETARY FACTORS, 942
    - METABOLISM, 1055*, 1064*, 1067*
    - SYNTHESIS, 1064*
  - AMYLASE
    - DIETARY FACTORS, 1091
  - AMYLOIDOSIS
    - ETIOLOGY, 1898
    - SIMULATION, 1898
    - ULTRASTRUCTURE, 1898
  - ANEURYSM
    - BLEEDING, 1700
  - ANOMALY, CONGENITAL
    - ANATOMY, 1681
    - SURGERY, 1856
  - BILIRUBIN
    - METABOLISM, 1057*, 1058*, 1138
  - BIOPSY
    - LIVER DISEASE, ALCOHOLIC, 1808
    - SEDATIVES, 1276
  - CALCIFICATION
    - DISEASES ASSOCIATED WITH, 1713
  - CARBOHYDRATE
    - METABOLISM, 966, 1066*, 1068, 1071, 1679
  - CARCINOGENESIS, 1085, 1148
  - CELLS
    - MICROSCOPY, 1675*
  - CHEMICAL COMPOSITION
    - AMINO ACIDS, 1140
    - ANTIHORMONES, 1115
    - DIETARY FACTORS, 1140
    - FATTY ACIDS, 1106, 1108
    - HORMONES, 1115
    - LIPIDS, 1108
  - CHOLESTEROL
    - METABOLISM, 1124
    - SYNTHESIS, 1129
  - CIRCULATION
    - ACETYLCHOLINE, 920
    - ANGIOGRAPHY, 1183
    - CATECHOLAMINE, 920
    - DRUG EFFECTS ON, 1107
    - GAS, 1455
    - JAUNDICE, OBSTRUCTIVE, 1179
    - NERVOUS CONTROL, 920
    - OBSTRUCTION, BILIARY TRACT, 919*
    - PARASITES AND PARASITIC DISEASES, 1951*
    - PORTAL HYPERTENSION, 1843
    - SURGERY, 1174
    - TRAUMA, 1180
    - VASOCONSTRICTORS, 1107
  - COLLAGEN
    - CIRRHOSIS, 1061*
  - COMPOSITION
    - CHROMIUM, 1691
  - COPPER
    - CIRRHOSIS, 1824
  - CROHNS DISEASE
    - DISEASES ASSOCIATED WITH, 1482
  - CYCLIC ADENOSINE MONOPHOSPHATE
    - DIETARY FACTORS, 1080
  - CYSTS
    - SCANNING, SCINTILLATION, 1708
  - DIAGNOSIS
    - ECHOGRAPHY, 1227, 1228
    - RADIOLOGY, 1222
    - SCANNING, SCINTILLATION, 1195*,

    1249
IALYSIS
  BIOCHEMISTRY, 1149
  FIBRINOLYSIS, 1090, 1139
  HEMATOLOGY, 1149
IETARY FACTORS
  PROTEIN, 1099
RUG METABOLISM
  ANTICOAGULANTS, 1098
  DIETARY FACTORS, 1099, 1151
  IRON, 1151
  REVIEWS, 1753
RUG TOXICITY
  ANTIBIOTICS, 1751
NZYMES, 1124
  AGE FACTORS, 1111, 1181
  ALCOHOL, 1060*
  AMINO ACIDS, 1140
  CHEMICAL PROPERTIES, 1123
  CIRCADIAN RHYTHM, 1053*, 1129
  DIETARY FACTORS, 942, 1097, 1099,
    1112, 1140
  DRUG EFFECTS ON, 1058*
  HEPATECTOMY, 1097
  HEPATITIS, VIRAL, 1285
  HORMONE CONTROL, 1111
  LIPIDS, 1110
  MICROORGANISMS, 1181
  OBSTRUCTION, BILIARY TRACT, 919*
  PHYSICAL PROPERTIES, 1123
ATTY ACIDS
  DIETARY FACTORS, 1079, 1112
  NEONATE, 1106
  SYNTHESIS, 1079
LUCONEOGENESIS
  AGE FACTORS, 1127
  AMINO ACIDS, 1137
  DIABETES, 1056*
  DIETARY FACTORS, 1056*, 1117
  ENZYMES, 1117
  GLUCAGON, 1056*
LUCOSE-6-PHOSPHATE DEHYDROGENASE
  ISOENZYMES, 1126
  PHYSICAL PROPERTIES, 1126
  ISOENZYMES, 1095
LYCOGEN
  CORI DISEASE, 1709
  METABOLISM, 1070
LYCOLYSIS
  AGE FACTORS, 1127
  ENZYMES, 1117
EMATOMA
  SCANNING, SCINTILLATION, 1263
ERNIA, 1683
ORMONE
  METABOLISM, 1075
ORMONE EFFECTS ON, 1714
NJURY
  ANESTHETICS, 1118
  ANTIBACTERIALS, 1721
  ANTIBIOTICS, 1705
  CARBON TETRACHLORIDE, 1114, 1142
  MORPHOLOGY, 1118
  NAPHTHYLISOTHIOCYANATE, ALPHA,
    1109
  PREVENTION, 1114
  ZINC, 1114
ON TRANSPORT
  CALCIUM, 960
  CELLS, 971
  HORMONE CONTROL, 960
  MAGNESIUM, 960
  MITOCHONDRIA, 966
  SIMULATION, 971
IRON
  METABOLISM, 1062*, 1063*, 1065*
LACTATE DEHYDROGENASE
  RADIATION, 1089
LIPID
  METABOLISM, 1110, 1125
LIPIDS
  DIETARY FACTORS, 1078, 1092, 1112
  ENVIRONMENTAL FACTORS, 1092
  SPECIES DIFFERENCES, 1112
  VITAMIN E, 1142
LYSOSOMES
  CHELATING AGENTS, 928
  ENZYMES, 928
  HEPARIN, 1152
METABOLISM
  ALCOHOL, 1069
  ALKALOIDS, 1093
  AMINO ACIDS, 1080, 1137
  ANESTHETICS, 1145
  BILIRUBIN, 1494
  DIETARY FACTORS, 1108
  DRUG EFFECTS ON, 1134
  ERYTHROCYTE, 909*
  GLUCAGON, 1144
  LIPOPROTEINS, 1134
  PENTAGASTRIN, 1128
  PROTEIN DEFICIENCY, 1072
  REGENERATION, 1074
  STEROIDS, 1053*
METASTASES
  ANGIOGRAPHY, 1287
  PROSTAGLANDINS, 1580
MICROSCOPY
  ANTIBODIES, 1677*
  ANTIGEN, AUSTRALIA, 1786
MITOCHONDRIA
  ENZYMES, 927, 1060*, 1125
MITOSIS
  VIBRATION, 940
MORPHOLOGY, 925
  ABORTION, 937
  ANGIOGRAPHY, 1183
  CARCINOGENESIS, 936
  CIRCULATION, 926
  CIRRHOSIS, 1820*, 1826, 1828, 1831
  EMBRYOLOGY, 937
  ERYTHROCYTE, 909*
  LEPROSY, 1748
  MITOSIS, 930, 936, 940
  OBSTRUCTION, BILIARY TRACT, 919*
  VITAMIN A, 1096
NEOPLASMS
  CHILDREN, 1719
NEOPLASMS, BENIGN, 1703, 1712
NEOPLASMS, MALIGNANT, 1684, 1723
  ALCOHOL DEHYDROGENASE, 1141
  CHEMOTHERAPY, 1216
  CHILDREN, 1216, 1682
  CYTOLOGY, 1148, 1704
  PROTEIN, 1085
  RADIOTHERAPY, 1216
  SCANNING, SCINTILLATION, 1200,
    1216

    SURGERY, 1710
  NERVOUS CONTROL
    GLYCOGENOLYSIS, 1143
    HYPERGLYCEMIA, 1143
  NUCLEIC ACIDS
    INSECTICIDES, 938
    REGENERATION, 1113
    SYNTHESIS, 1059*, 1113
  PHOSPHATASE
    AGE FACTORS, 1136
    CORTICOSTEROIDS, 1136
  PHOSPHATASE, ACID
    HYPEROXIA, 1105
  PHYSICAL PROPERTIES
    CIRCADIAN RHYTHM, 1186
  PIGMENTATION
    DUBIN-JOHNSON SYNDROME, 1726*
  PRESSURE STUDIES
    VAGOTOMY, 1924
  PROTEIN
    AGE FACTORS, 1055*
    DIETARY FACTORS, 1073
    HEREDITARY FACTORS, 1087
    METABOLISM, 1135
    SYNTHESIS, 1055*, 1073
  PYRIMIDINE
    SYNTHESIS, 925
  REGENERATION
    AGE FACTORS, 1082
    AMINO ACIDS, 1131
    ANGIOGRAPHY, 1084
    CIRCULATION, 1116
    CIRRHOSIS, 1061*
    CORTICOSTEROIDS, 1116
    DRUG EFFECTS ON, 1061*
    ENZYMES, 1074, 1097
    HORMONE CONTROL, 1059*
    MITOSIS, 1059*
    NUCLEIC ACIDS, 1131
    PROTEIN SYNTHESIS, 1102
  RIBOSOMES
    ISOLATION, 922
  SCANNING, SCINTILLATION
    CYSTIC FIBROSIS, 1699
    LIVER DISEASE, 1230
  SCHISTOSOMIASIS
    CIRCULATION, 1967
    FIBROSIS, 1967
  SECRETION
    ANTIBIOTICS, 1051*
    TRIGLYCERIDE, 1051*, 1130
  SURGERY
    TECHNIQUES, 1685
  TISSUE CULTURE
    DRUG TOXICITY, 1743
  TRANSPLANTATION
    CIRCULATION, 1100
    COMPLICATIONS, 1410
    IMMUNOSUPPRESSION, 1104, 1706
    SURVIVAL, 1104
  TRAUMA
    SCANNING, SCINTILLATION, 1263
    SIMULATION, 1101
    SURGERY, 1702
  TUBERCULOSIS
    ANTIBIOTICS, 1741
  ULTRASTRUCTURE, 915*
    ANTIHORMONES, 1115
    CARBON TETRACHLORIDE, 913*
    CHEMICAL COMPOSITION, 917*
    CIRRHOSIS, 1820*
    DRUG EFFECTS ON, 966
    DRUG METABOLISM, 1146
    DUBIN-JOHNSON SYNDROME, 1726*
    ENZYMES, 1068
    GLUCAGON, 1144
    HORMONES, 1115
    IRON, 1063*
    LIPIDS, 1110
    LIVER DISEASE, ALCOHOLIC, 1806*, 1813
    NARCOTICS, 1735
    PROTEIN, 1135
  UREA SYNTHESIS
    DRUG EFFECTS ON, 1067*
  VITAMIN A
    METABOLISM, 1096

LIVER COMA
  PORTAL HYPERTENSION
    SURGERY, 1821*
  TREATMENT
    PLASMAPHERESIS, 1760*, 1764*
    TRANSFUSION, 1771, 1774

LIVER DISEASE
  ANTIBIOTIC
    METABOLISM, 1711
  ANTIGEN, AUSTRALIA, 1799
  BILE ACIDS
    METABOLISM, 1819*
    REVIEWS, 1689
  BLOOD
    ENZYMES, 1209
    LIPIDS, 1715
    LIPOPROTEINS, 1720
  DIAGNOSIS
    ANTIGEN, AUSTRALIA, 1217
    BIOPSY, 1226
    CALCIFICATION, 1695
    ENZYMES, 1259, 1688, 1697, 1707
    PHOSPHATASE, ALKALINE, 1246
    SCANNING, SCINTILLATION, 1218, 1225
    TRACER STUDIES, 1218
  DISEASE ASSOCIATED WITH
    ENDOCRINE SYSTEM, 1694
  DISEASES ASSOCIATED WITH
    CIRCULATION, 1724
    STEATORRHEA, 1487*
  DRUG TREATMENT, 1829
  EPIDEMIOLOGY, 1718
  IMMUNOLOGY, 1692, 1693
  KWASHIORKOR
    DISEASES ASSOCIATED WITH, 1494
  LIPID
    MALABSORPTION, 1487*
  LIVER
    SCANNING, SCINTILLATION, 1230
  MALNUTRITION
    DISEASES ASSOCIATED WITH, 1493
  SIMULATION
    MORPHOLOGY, 1150
  TREATMENT
    DIALYSIS, 1716
    SURGERY, 1717

LIVER DISEASE, ALCOHOLIC

    CARBOHYDRATES, 1810
    DIETARY FACTORS, 1814
    HEPATITIS, 1805*
    HYPERLIPEMIA
        ETIOLOGY, 1757*
    LIVER
        BIOPSY, 1808
        ULTRASTRUCTURE, 1806*, 1813
    PANCREAS
        LIPASE, 1486*
    PANCREAS FUNCTION TEST, 1809, 1810
    THERAPY, 1811
        REVIEWS, 1812
    TRIGLYCERIDE
        METABOLISM, 1486*

LIVER DISEASES
    DIAGNOSIS
        SCANNING, SCINTILLATION, 1199
    ETIOLOGY
        CONTRAST MEDIA, 1690
        SCHISTOSOMIASIS, 1965

LIVER FUNCTION TESTS
    BROMOSULFOPHTHALEIN
        GILBERTS DISEASE, 1725*
    CROHNS DISEASE, 1482
    DRUG TOXICITY
        ANTIBACTERIALS, 1754
    JAUNDICE
        DIAGNOSIS, 1222
    LIVER
        AMEBIASIS, 1957
    PROTHROMBIN
        TECHNIQUES, 1279
    REVIEWS, 1277
    SULFOBROMOPHTHALEIN
        TECHNIQUES, 1283
    TRANQUILIZERS, 1119

LIVER FUNTION TESTS
    DIABETES, 1203

LIVER INJURY
    CARBON TETRACHLORIDE
        GLUCOSE-6-PHOSPHATE DEHYDROGENASE, 1095
        PREVENTION, 1052*
        ULTRASTRUCTURE, 1052*
    DIETARY FACTORS, 1093
    DRUG EFFECTS ON, 923
    ENZYMES
        CARBON TETRACHLORIDE, 1088, 1094
    ETIOLOGY, 1076
    FIBROSIS
        CARBON TETRACHLORIDE, 913*
    GALACTOSAMINE
        DRUG EFFECTS ON, 1067*
    IMMUNOLOGY, 1076
    MITOCHONDRIA
        CARBON TETRACHLORIDE, 1088
    SEX FACTORS, 1093
    ULTRASTRUCTURE
        ENZYMES, 1094

LYMPH
    AMYLASE
        PANCREATITIS, 1659
    LIPASE
        PANCREATITIS, 1659
    SMALL INTESTINE
        IODINE, 1169

LYMPHANGIECTASIA
    INTESTINE
        ANOMALY, CONGENITAL, 1507
        DISEASES ASSOCIATED WITH, 1490

LYMPHATICS
    COLON
        POLYPS, 1585
    GASTROINTESTINAL
        DISEASES, 1913
    INTESTINE
        TECHNIQUES, 1185

LYSOSOMES
    LIVER
        CHELATING AGENTS, 928
        ENZYMES, 928
        HEPARIN, 1152

MAGNESIUM
    DEFICIENCY
        CROHNS DISEASE, 1582
    LIVER
        ION TRANSPORT, 960
    MALABSORPTION
        DIARRHEA, 1900

MALABSORPTION
    ABSORPTION
        PEPTIDE, 1515
    AMINO ACIDS, 1515
    ANEMIA
        DISEASES ASSOCIATED WITH, 1434
    BILE ACIDS
        REVIEWS, 1854
    CHILDREN, 1497
        REVIEWS, 1499, 1508
    CROHNS DISEASE, 1471, 1482
    DIAGNOSIS
        CHILDREN, 1202
    DIARRHEA
        MALNUTRITION, 1502
    EPIDEMIOLOGY
        DIETARY FACTORS, 1505
    FOLIC ACID
        BLIND LOOP SYNDROME, 954
    GASTROINTESTINAL
        DISEASE, 1512
    GIARDIASIS
        CHILDREN, 1962
        DISEASES ASSOCIATED WITH, 1962
    IMMUNOGLOBULINS, 1506
    LIPID
        LIVER DISEASE, 1487*
    LIPIDS
        ETIOLOGY, 1441
    MAGNESIUM
        DIARRHEA, 1900
    PEPTIC ULCER
        SURGERY, 1426
    SIMULATION
        REVIEWS, 1500
    SMALL INTESTINE
        MORPHOLOGY, 1510
    TUBERCULOSIS

    - DRUG TREATMENT, 1498
  - VITAMIN B2
    - BLIND LOOP SYNDROME, 948*
  - VITAMIN B12
    - ANTIBACTERIALS, 1498
    - BLIND LOOP SYNDROME, 947*
    - ETIOLOGY, 1441
    - FAMILIAL FACTORS, 1510
    - ETIOLOGY, 1154*
  - VITAMIN E
    - BILIARY ATRESIA, 1260

- MALACOPLAKIA
  - COLON
    - MORPHOLOGY, 1610
    - ULTRASTRUCTURE, 1610

- MALIGNANT
  - SEE NEOPLASMS, MALIGNANT

- MALNUTRITION
  - DIARRHEA
    - ETIOLOGY, 1492
    - MALABSORPTION, 1502
  - DISEASES ASSOCIATED WITH
    - LIVER DISEASE, 1493
  - SMALL INTESTINE
    - ENZYMES, 1166
    - MORPHOLOGY, 1166

- MANOMETRY
  - SEE PRESSURE STUDIES

- MARKER STUDIES
  - BILE
    - SECRETION, 1184
  - INTESTINE
    - MOTILITY, 1184
  - JAUNDICE, OBSTRUCTION
    - DIAGNOSIS, 1198
  - PANCREAS
    - ENZYMES, 1184
  - STEATORRHEA
    - DIAGNOSIS, 1219
  - STOMACH
    - MOTILITY, 1184
    - SECRETION, 1184

- MEGACOLON
  - CROHNS DISEASE
    - DISEASES ASSOCIATED WITH, 1611
  - ULTRASTRUCTURE, 1516*

- MENETRIERS DISEASE
  - DISEASES ASSOCIATED WITH, 1345*
  - METABOLISM
    - STOMACH, 1345*

- MESENTERY
  - TOXOPLASMOSIS, 1956

- METABOLISM
  - ALCOHOL, 1807
    - CARBOHYDRATE, 1815
    - DIET THERAPY, 1815
  - AMINO ACIDS
    - LARGE INTESTINE, 1165
    - LIVER, 1055*, 1064*, 1067*
    - PROTEIN DEFICIENCY, 1072
  - ANTIBIOTIC
    - LIVER DISEASE, 1711
  - ASPIRIN
    - SEX FACTORS, 1910
  - BILE
    - TRANQUILIZERS, 1698
  - BILE ACIDS
    - CHOLELITHIASIS, 1848
    - CIRRHOSIS, 1819*
    - FATTY LIVER, 1816
    - ILEOSTOMY, 1518*
    - KWASHIORKOR, 1489
    - LIVER DISEASE, 1819*
    - MICROORGANISMS, 1160
    - PROCTOCOLECTOMY, 1518*
  - BILIRUBIN
    - DIETARY FACTORS, 1086
    - DRUG EFFECTS ON, 1057*, 1058*
    - FATTY ACIDS, 1729, 1732
    - HORMONE CONTROL, 1054*
    - INTESTINE, 1057*
    - LIVER, 1057*, 1058*, 1138
    - NARCOTICS, 1735
    - SEDATIVES, 1736
  - CARBOHYDRATE
    - ACIDOSIS, 1066*
    - ALKALOSIS, 1066*
    - FATTY LIVER, 1747
    - HEPATITIS, CHRONIC, 1802
    - HYPERBILIRUBINEMIA, 1734
    - LIVER, 966, 1066*, 1071, 1679
    - PANCREAS, 1049
    - PORTACAVAL SHUNT, 1817*
    - SMALL INTESTINE, 1158*
  - CHOLESTEROL
    - LIVER, 1124
  - COPPER
    - CIRRHOSIS, 1678*
    - HEPATITIS, VIRAL, 1769
    - WILSONS DISEASE, 1678*
  - ERYTHROCYTE
    - LIVER, 909*
  - GASTRIN, 1003
  - GLYCOGEN
    - DIETARY FACTORS, 1070
    - LIVER, 1070
  - HORMONE
    - LIVER, 1075
  - IRON
    - DRUG EFFECTS ON, 1065*
    - LIVER, 1062*, 1063*, 1065*
  - KININ
    - LARGE INTESTINE, 1162
    - SPECIES DIFFERENCES, 1162
  - LIPID
    - LIVER, 1110, 1125
  - LIPIDS
    - FATTY LIVER, 1816
  - LIVER
    - ALCOHOL, 1069
    - ALKALOIDS, 1093
    - AMINO ACIDS, 1080, 1137
    - ANESTHETICS, 1145
    - BILIRUBIN, 1494
    - CARBOHYDRATE, 1068
    - DIETARY FACTORS, 1108
    - DRUG EFFECTS ON, 1134
    - GLUCAGON, 1144
    - LIPOPROTEINS, 1134

- PENTAGASTRIN, 1128
- PROTEIN DEFICIENCY, 1072
- REGENERATION, 1074
- STEROIDS, 1053*

MENETRIERS DISEASE
- STOMACH, 1345*

MITOCHONDRIA
- ALCOHOL, 1069

PANCREAS
- ANESTHESIA, 1047
- NUCLEIC ACIDS, 1043
- PROTEIN, 1047
- PSEUDOCYST, 1662

PHOSPHOLIPID
- SMALL INTESTINE, 1167

PROTEIN
- LIVER, 1135
- STOMACH, 1345*

SEDATIVES
- HEPATITIS, VIRAL, 1778

SMALL INTESTINE
- LIPIDS, 912*
- STEROIDS, 912*
- SURGERY, 1158*

STEROL, 1929

TRIGLYCERIDE
- DRUG EFFECTS ON, 1122
- LIVER DISEASE, ALCOHOLIC, 1486*

UREA
- DIETARY FACTORS, 1176

VITAMIN A
- LIVER, 1096

METASTASES
- COLON
  - NEOPLASMS, MALIGNANT, 1933
- LIVER
  - ANGIOGRAPHY, 1287
  - PROSTAGLANDINS, 1580
- RECTUM
  - NEOPLASMS, MALIGNANT, 1569
- STOMACH
  - NEOPLASMS, MALIGNANT, 1366, 1933

MICROORGANISMS
- CECUM
  - BILE ACIDS, 1160
- DIARRHEA
  - ETIOLOGY, 1893
- ILEUM
  - BILE ACIDS, 1160
- LIVER
  - ENZYMES, 1181
- METABOLISM
  - BILE ACIDS, 1160

MICROSCOPY
- ANTIGEN, AUSTRALIA, 1787
  - CIRRHOSIS, 1762*
  - HEPATITIS, CHRONIC, 1762*
  - HEPATITIS, VIRAL, 1762*
  - IMMUNOLOGY, 1773
- HEPATITIS, VIRAL
  - IMMUNOLOGY, 1759*
- LIVER
  - ANTIBODIES, 1677*
  - ANTIGEN, AUSTRALIA, 1786
  - CELLS, 1675*

MITOCHONDRIA
- LIVER
  - ENZYMES, 927, 1060*, 1125
  - ION TRANSPORT, 966
- LIVER INJURY
  - CARBON TETRACHLORIDE, 1088
- METABOLISM
  - ALCOHOL, 1069
- SMALL INTESTINE
  - DIETARY FACTORS, 914*

MITOSIS
- LIVER
  - MORPHOLOGY, 930, 936, 940
  - REGENERATION, 1059*
  - VIBRATION, 940
- STOMACH
  - MUCOSA, 1342*

MORTALITY
- SEE SURVIVAL
- BLEEDING
  - AGE FACTORS, 1948
- GASTROINTESTINAL
  - BLEEDING, 1939
- PORTAL HYPERTENSION
  - SURGERY, 1821*

MOTILITY
- BILIARY TRACT
  - VAGOTOMY, 1869
- COLON
  - CONSTIPATION, 1942
  - DIARRHEA, 1942
  - ION EFFECTS ON, 987
  - NERVOUS CONTROL, 982*
  - SURGERY, 977*
- DUODENUM
  - DRUG EFFECTS ON, 981*
  - GLUCAGON, 975*
- ESOPHAGUS
  - ACHALASIA, 1291*
  - CHOLINERGIC AGENTS, 978*
  - DEGLUTITION, 974*
  - HORMONE CONTROL, 978*
  - PENTAGASTRIN, 991
  - TECHNIQUES, 979*
- GASTROINTESTINAL
  - CORTICOSTEROIDS, 988
  - DIAGNOSIS, 990
  - HORMONE FACTORS, 988
  - SIMULATION, 989
- ILEUM, 982*
- INTESTINE
  - MARKER STUDIES, 1184
- LARGE INTESTINE, 983, 1548
- ODDI, SPHINCTER OF
  - DRUG EFFECTS ON, 981*
- PANCREAS DISEASE
  - DIAGNOSIS, 1241
- SMALL INTESTINE
  - BIOPOTENTIALS, 973*, 980*
  - DRUG EFFECTS ON, 984
  - HORMONE CONTROL, 973*, 980*
  - NERVOUS CONTROL, 984
  - SIMULATION, 976*
  - TECHNIQUES, 976*
- STOMACH
  - DRUG EFFECTS ON, 986, 1406

    - HORMONES, 1025
    - MARKER STUDIES, 1184
    - SEX FACTORS, 986
    - VAGOTOMY, 1400, 1406

- MUCOPOLYSACCHARIDE
  - STOMACH
    - MUCOSA, 1014

- MUCOSA
  - ESOPHAGUS
    - PROLAPSE, 1320
  - RECTUM
    - RADIOTHERAPY, 1566
  - SMALL INTESTINE
    - CHILDREN, 1444
    - MORPHOLOGY, 1444, 1445
  - STOMACH
    - ENZYMES, 1014
    - MITOSIS, 1342*
    - MUCOPOLYSACCHARIDE, 1014
    - PYLOROPLASTY, 1342*
    - VAGOTOMY, 1014, 1342*

- MUCUS
  - STOMACH
    - ZOLLINGER-ELLISON SYNDROME, 1890

- MUSCULOSKELETAL SYSTEM
  - CIRRHOSIS
    - DISEASES ASSOCIATED WITH, 1825, 1839
  - CROHNS DISEASE
    - DISEASES ASSOCIATED WITH, 1468*
  - DYSPHAGIA
    - DISEASES ASSOCIATED WITH, 1313
  - ESOPHAGUS DISEASES
    - DISEASES ASSOCIATED WITH, 1312
  - HEPATITIS, VIRAL
    - DISEASES ASSOCIATED WITH, 1765, 1789
  - PROTEIN-LOSING ENTEROPATHY
    - DISEASES ASSOCIATED WITH, 1438
  - ULCERATIVE COLITIS
    - DISEASES ASSOCIATED WITH, 1468*

- MYCOSIS
  - SEE FUNGUS DISEASE

- NAPHTHYLISOTHIOCYANATE, ALPHA
  - LIVER
    - INJURY, 1109

- NARCOTICS
  - BILIRUBIN
    - METABOLISM, 1735
  - JAUNDICE
    - NEONATE, 1735
  - LIVER
    - ULTRASTRUCTURE, 1735

- NECROSIS
  - LARGE INTESTINE
    - ETIOLOGY, 1561
  - PANCREAS
    - SURGERY, 1640
  - SMALL INTESTINE
    - ETIOLOGY, 1561
  - STOMACH
    - GASTRECTOMY, 1378

- NEONATE
  - SEE ALSO AGE FACTORS, CHILDREN
  - ABSORPTION
    - PROTEIN, 955
  - BLOOD
    - BILIRUBIN, 1727*
  - DIARRHEA
    - ANTIBIOTICS, 1889
    - THERAPY, 1889
  - DUODENUM
    - OBSTRUCTION, 1455
  - ENTEROCOLITIS, 1558
    - RADIOLOGY, 1931
  - GASTROENTERITIS, 1889
  - HIRSCHSPRUNGS DISEASE, 1590
  - HYPERBILIRUBINEMIA
    - DRUG TREATMENT, 1734
    - PREVENTION, 1728*
    - SEDATIVES, 1736
  - JAUNDICE
    - DIAGNOSIS, 1260
    - ETIOLOGY, 1732
    - NARCOTICS, 1735
  - LIVER
    - FATTY ACIDS, 1106
  - PYLORUS
    - STENOSIS, 1364
  - SMALL INTESTINE
    - ABSORPTION, 953
  - STOMACH
    - VOLVULUS, 1370

- NEOPLASMS
  - BILIARY TRACT
    - SCANNING, SCINTILLATION, 1187*
  - DUODENUM
    - SCANNING, SCINTILLATION, 1187*
  - ESOPHAGUS
    - SURGERY, 1326
  - GASTROINTESTINAL
    - DISEASES ASSOCIATED WITH, 1908
  - LIVER
    - CHILDREN, 1719
  - PANCREAS
    - GASTRIN, 1639
    - SCANNING, SCINTILLATION, 1187*
    - ZOLLINGER-ELLISON SYNDROME, 1639

- NEOPLASMS, BENIGN
  - SEE ALSO POLYPS
  - ANUS, 1539
  - COLON, 1540
  - DIVERTICULUM, MECKELS
    - BLEEDING, 1446
    - DIAGNOSIS, 1446
    - THERAPY, 1446
  - DUODENUM
    - DIAGNOSIS, 1453
  - ESOPHAGUS
    - DISEASES ASSOCIATED WITH, 1317
    - NERVOUS SYSTEM, 1334
    - SURGERY, 1314
  - GALLBLADDER, 1847
  - LARGE INTESTINE
    - NERVOUS SYSTEM, 1555
  - LIVER, 1703, 1712
  - PANCREAS

        - DISEASES ASSOCIATED WITH, 1631
    - RECTUM, 1568
        - ALKALOSIS, 1565
    - SMALL INTESTINE, 1460
        - DIAGNOSIS, 1442, 1465
    - STOMACH, 1353
        - ADOLESCENTS, 1351
        - BLEEDING, 1372
        - CHILDREN, 1347
        - DIAGNOSIS, 1351, 1357
        - SURGERY, 1347
        - THERAPY, 1357

- NEOPLASMS, MALIGNANT
    - ANEMIA, PERNICIOUS
        - DISEASES ASSOCIATED WITH, 1343*
    - BILE DUCT
        - DIAGNOSIS, 1696
        - SURGERY, 1701
    - BILIARY TRACT
        - SURGERY, 1651, 1860, 1875
    - GASTROINTESTINAL
        - DIAGNOSIS, 1934
        - IMMUNOLOGY, 1934
    - CELIAC DISEASE
        - DISEASES ASSOCIATED WITH, 1504
    - COLON
        - DRUG TREATMENT, 1933
        - IMMUNOLOGY, 1526*, 1905
        - METASTASES, 1933
        - RECURRENCE, 1595
    - CROHNS DISEASE
        - DISEASES ASSOCIATED WITH, 1467*, 1473
    - DIAGNOSIS
        - ECHOGRAPHY, 1189*
    - DUODENUM
        - DIAGNOSIS, 1288, 1453
        - SURGERY, 1651
    - ESOPHAGUS
        - BLEEDING, 1296
        - DIETARY FACTORS, 1332
        - DYSPHAGIA, 1297
        - ENDOSCOPY, 1215
        - EPIDEMIOLOGY, 1298, 1308
        - ETIOLOGY, 1308, 1332
        - EXFOLIATIVE CYTOLOGY, 1215
        - PERFORATION, 1335
        - RADIOTHERAPY, 1327
        - SURGERY, 1295, 1327, 1336
        - SURVIVAL, 1295
        - THERAPY, 1304
    - GALLBLADDER, 1880
        - ANGIOGRAPHY, 1879
        - EPIDEMIOLOGY, 1857
        - SURVIVAL, 1857, 1867
    - GASTRITIS
        - DISEASES ASSOCIATED WITH, 1349
    - GASTROINTESTINAL, 1895
        - ANTIGEN, 1886*, 1945
        - CYTOLOGY, 1173*
        - DIAGNOSIS, 1886*
        - IMMUNOLOGY, 1173*
        - REVIEWS, 1888, 1895
    - LARGE INTESTINE, 1524*
        - AGE FACTORS, 1581
        - BIOPSY, 1517*
        - DIAGNOSIS, 1519*
        - DISEASES ASSOCIATED WITH, 1562
        - ILEUS, 1572
        - IMMUNOLOGY, 1519*
        - PHOSPHATASE, ALKALINE, 1549
        - SURGERY, 1536
        - TISSUE CULTURE, 1517*
    - LIVER, 1684, 1723
        - ALCOHOL DEHYDROGENASE, 1141
        - CHEMOTHERAPY, 1216
        - CHILDREN, 1216, 1682
        - CYTOLOGY, 1148, 1704
        - PROTEIN, 1085
        - RADIOTHERAPY, 1216
        - SCANNING, SCINTILLATION, 1200, 1216
        - SURGERY, 1710
    - PANCREAS, 1637, 1641
        - DIAGNOSIS, 1288, 1638
        - DISEASES ASSOCIATED WITH, 1467*
        - ETIOLOGY, 1381
        - RADIOLOGY, 1628
        - SURGERY, 1647, 1651
        - SURVIVAL, 1381
    - PERITONEUM, 1930
    - RECTUM
        - CROHNS DISEASE, 1473
        - ENDOSCOPY, 1210
        - IMMUNOLOGY, 1905
        - METASTASES, 1569
        - SURGERY, 1589
        - SURVIVAL, 1608
    - SIGMOID
        - COLITIS, 1609
    - SMALL INTESTINE
        - DIAGNOSIS, 1442, 1465
        - DISEASES ASSOCIATED WITH, 1467*
    - STOMACH, 1367
        - AGE FACTORS, 1369
        - DIAGNOSIS, 1278, 1289, 1290, 1343*, 1350, 1352, 1363, 1366, 1374
        - DISEASES ASSOCIATED WITH, 1343*, 1349, 1356, 1379
        - DRUG TREATMENT, 1933
        - ENDOSCOPY, 1215
        - EPIDEMIOLOGY, 1356
        - ETIOLOGY, 1381
        - EXFOLIATIVE CYTOLOGY, 1215
        - IMMUNOLOGY, 1375
        - LACTATE DEHYDROGENASE, 1194*
        - METASTASES, 1366, 1933
        - METASTASIS, 1371
        - SURGERY, 1350
        - SURVIVAL, 1343*, 1350, 1381
        - THERAPY, 1356

- NERVOUS CONTROL
    - COLON
        - MOTILITY, 982*
    - GASTRIN, 1387*
    - LIVER
        - CIRCULATION, 920
        - GLYCOGENOLYSIS, 1143
        - HYPERGLYCEMIA, 1143
    - PANCREAS
        - SECRETION, 1039, 1643
    - SERUM
        - GASTRIN, 1390*
    - SMALL INTESTINE
        - CIRCULATION, 1182
        - MOTILITY, 984

- STOMACH
  - ACID SECRETION, 997*, 1018, 1024, 1248
  - CIRCULATION, 1182

NERVOUS SYSTEM
- DUODENUM
  - MORPHOLOGY, 921
- ESOPHAGITIS, REFLUX
  - DISEASES ASSOCIATED WITH, 1307
- ESOPHAGUS
  - NEOPLASMS, BENIGN, 1334
- HEPATITIS, VIRAL
  - DISEASES ASSOCIATED WITH, 1781
- INTESTINE
  - MORPHOLOGY, 929
- LARGE INTESTINE
  - NEOPLASMS, BENIGN, 1555
- PYLORUS
  - MORPHOLOGY, 921
- STOMACH
  - MORPHOLOGY, 924
- SURGERY
  - PANCREATITIS, 1673

NUCLEIC ACIDS
- DUODENUM
  - PENTAGASTRIN, 993
- LIVER
  - INSECTICIDES, 938
  - REGENERATION, 1113, 1131
  - SYNTHESIS, 1059*
- PANCREAS
  - DIETARY FACTORS, 1043
  - METABOLISM, 1043
- STOMACH
  - PENTAGASTRIN, 993
- SYNTHESIS
  - LIVER, 1113
  - SMALL INTESTINE, 1164

OBSTRUCTION
- BILIARY TRACT
  - SCANNING, SCINTILLATION, 1266
- DUODENUM
  - NEONATE, 1455
  - RADIOLOGY, 1455
- INTESTINE
  - ETIOLOGY, 1462
  - RADIOLOGY, 1205
  - REVIEWS, 1461
- LARGE INTESTINE
  - REVIEWS, 1532
- PANCREAS
  - CARBONIC ANHYDRASE, 911*
- PANCREATIC DUCT
  - THERAPY, 1644
- PYLORUS
  - CHOLELITHIASIS, 1881
- SIGMOID
  - ENDOMETRIOSIS, 1574
- SMALL INTESTINE, 1433
  - CIRCULATION, 1463
  - COMPLICATIONS, 1463
  - DIAGNOSIS, 1456
  - ENDOMETRIOSIS, 1454
  - RADIOLOGY, 1456

OBSTRUCTION, BILIARY TRACT
- LIVER
  - CIRCULATION, 919*
  - ENZYMES, 919*
  - MORPHOLOGY, 919*

OBSTRUCTIVE JAUNDICE
- SEE JAUNDICE, OBSTRUCTIVE

ODDI, SPHINCTER OF
- MOTILITY
  - DRUG EFFECTS ON, 981*

OXYGEN
- SMALL INTESTINE
  - ISCHEMIA, 1448
- TRANSPORT
  - GLUCOSE, 969

PAIN
- ESOPHAGUS
  - DRUG TREATMENT, 985
  - SURGERY, 985
- RECTUM
  - FAMILIAL FACTORS, 1601

PANCREAS
- ABSCESS
  - DIAGNOSIS, 1190*
  - SALMONELLOSIS, 1670
- ADENOSINE TRIPHOSPHATASE, 1035*
- ANEURYSM
  - RUPTURE, 1636
- BIOPOTENTIALS
  - ACETYLCHOLINE, 1036*
  - PANCREOZYMIN, 1036*
- CALCULI
  - ASCITES, 1646
- CARBOHYDRATE
  - METABOLISM, 1049
- CHYMOTRYPSIN
  - CHEMICAL COMPOSITION, 1046
- CIRRHOSIS
  - ETIOLOGY, 1630
  - SYPHILIS, 1630
- CYSTS
  - ECHINOCOCCOSIS, 1649
- DIAGNOSIS
  - BICARBONATE, 1281
  - BIOPSY, 1258
  - CONTRAST MEDIA, 1257
  - ENDOSCOPY, 1253, 1288
  - ENZYMES, 1229
  - PANCREAS FUNCTION TESTS, 1234
  - SCANNING, SCINTILLATION, 1254
  - TECHNIQUES, 1258
- ENZYMES, 1035*
  - MARKER STUDIES, 1184
  - REVIEWS, 1041
- LIPASE
  - LIVER DISEASE, ALCOHOLIC, 1486*
- METABOLISM
  - ANESTHESIA, 1047
  - NUCLEIC ACIDS, 1043
  - PROTEIN, 1047
- MORPHOLOGY
  - SCHISTOSOMIASIS, 1954
  - TECHNIQUES, 935

  - NECROSIS
    - SURGERY, 1640
  - NEOPLASMS
    - GASTRIN, 1639
    - SCANNING, SCINTILLATION, 1187*
    - ZOLLINGER-ELLISON SYNDROME, 1639
  - NEOPLASMS, BENIGN
    - DISEASES ASSOCIATED WITH, 1631
  - NEOPLASMS, MALIGNANT, 1637, 1641
    - DIAGNOSIS, 1288, 1638
    - DISEASES ASSOCIATED WITH, 1467*
    - ETIOLOGY, 1381
    - RADIOLOGY, 1628
    - SURGERY, 1647, 1651
    - SURVIVAL, 1381
  - NUCLEIC ACIDS
    - DIETARY FACTORS, 1043
  - OBSTRUCTION
    - CARBONIC ANHYDRASE, 911*
  - PSEUDOCYST, 1645
    - CIRCULATION, 1662
    - DIAGNOSIS, 1190*
    - METABOLISM, 1662
  - REVIEWS, 1650
  - SARCOIDOSIS, 1648
  - SCANNING, SCINTILLATION
    - REVIEWS, 1247
    - TECHNIQUES, 1190*
  - SECRETION, 1036*
    - AMINO ACIDS, 1045
    - AMYLASE, 1032*, 1039, 1044
    - BICARBONATE, 1040, 1045, 1281
    - CALCIUM, 1034*
    - CHEMICAL COMPOSITION, 1050
    - CHOLINERGIC AGENTS, 1042
    - CYCLIC ADENOSINE MONOPHOSPHATE, 1033*, 1034*
    - DIABETES, 1044
    - DIETARY FACTORS, 1042, 1050
    - ENZYMES, 1040
    - HORMONE CONTROL, 1039, 1635, 1643
    - HORMONE EFFECTS ON, 1013, 1395*
    - INSULIN, 1044
    - NERVOUS CONTROL, 1039, 1643
    - PANCREOZYMIN, 1033*, 1233
    - PROTEIN, 1039, 1042, 1045
    - SECRETIN, 1040, 1233, 1281
    - SECRETION, 1033*
    - SMOKING, 1037*
    - TRYPSIN, 1038
    - TRYPSINOGEN, 1038
    - VAGOTOMY, 1395*
  - SURGERY
    - REVIEWS, 1642
  - TRANSPLANTATION
    - TECHNIQUES, 1048
  - TRAUMA
    - SURGERY, 1629
    - THERAPY, 1632
  - ULTRASTRUCTURE
    - CARBONIC ANHYDRASE, 911*

- PANCREAS DISEASE
  - BLOOD
    - ENZYMES, 1209
  - DIAGNOSIS, 1233
    - AMYLASE, 1269
    - ANGIOGRAPHY, 1241, 1270
    - ECHOGRAPHY, 1261
    - LIPASE, 1269
    - MOTILITY, 1241
    - RADIOLOGY, 1261
    - REVIEWS, 1634
    - SCANNING, SCINTILLATION, 1241, 1261
    - TECHNIQUES, 1272
    - TRYPSIN, 1214
  - HEPATITIS
    - DISEASES ASSOCIATED WITH, 1770
  - SECRETION, 1643

- PANCREAS FUNCTION TEST
  - LIVER DISEASE, ALCOHOLIC, 1809, 1810

- PANCREAS FUNCTION TESTS
  - PANCREAS
    - DIAGNOSIS, 1234
  - TRYPSIN
    - TECHNIQUES, 1257

- PANCREATECTOMY
  - PANCREATITIS
    - SURGERY, 1668

- PANCREATIC DUCT
  - OBSTRUCTION
    - THERAPY, 1644
  - STENOSIS
    - ENDOSCOPY, 1196*

- PANCREATITIS
  - ALCOHOL
    - EPIDEMIOLOGY, 1665
  - ASCITES, 1646
  - BLOOD
    - AMYLASE, 1657, 1663
    - LIPASE, 1667
  - COMPLICATIONS
    - BLEEDING, 1671
  - DIAGNOSIS
    - AMYLASE, 1294*
    - ECHOGRAPHY, 1189*
    - ENDOSCOPY, 1196*
    - RADIOLOGY, 1237
    - REVIEWS, 1669
    - SCANNING, SCINTILLATION, 1190*
  - DISEASES ASSOCIATED WITH
    - RESPIRATORY SYSTEM, 1655
  - DUODENUM
    - RADIOLOGY, 1239
  - ETIOLOGY
    - ALCOHOL, 1661
    - ENDOCRINE SYSTEM, 1664
  - IMMUNOLOGY, 1362
  - IRON
    - ABSORPTION, 1672
  - LYMPH
    - AMYLASE, 1659
    - LIPASE, 1659
  - MORPHOLOGY, 1660
  - PREGNANCY
    - DIGNOSIS, 1654*
  - PROTEOLYTIC
    - ENZYMES, 1656
  - SEQUELAE
    - COLON, 1652*
    - DIABETES, 1653*
  - STOMACH

  - BLEEDING, 1666
- SURGERY, 1647
  - NERVOUS SYSTEM, 1673
  - PANCREATECTOMY, 1668
- THERAPY, 1660, 1663
  - ANTIENZYMES, 1659
  - DIALYSIS, 1658
  - GLUCAGON, 1667

PANCREOZYMIN
- PANCREAS
  - BIOPOTENTIALS, 1036*
  - SECRETION, 1033*, 1233

PARASITES AND PARASITIC DISEASES, 1958
- DISEASES ASSOCIATED WITH
  - ILEUS, 1966
  - PORTAL HYPERTENSION, 1951*
  - RESPIRATORY SYSTEM, 1964
- INTESTINE
  - INFLAMMATION, 1950*
- LIVER
  - CIRCULATION, 1951*

PARATYPHOID FEVER
- SEE SALMONELLOSIS

PARIETAL CELL
- PEPTIC ULCER
  - RECURRENCE, 1389*

PENTAGASTRIN
- ACID SECRETION
  - PEPTIC ULCER, 998*
- DUODENUM
  - NUCLEIC ACIDS, 993
- ESOPHAGUS
  - MOTILITY, 991
- LIVER
  - METABOLISM, 1128
- STOMACH
  - ACID SECRETION, 1128, 1393*
  - NUCLEIC ACIDS, 993

PEPSIN
- SECRETION
  - DRUG EFFECTS ON, 1398
- STOMACH
  - DRUG EFFECTS ON, 996*, 1022
  - HISTAMINE, 1012
  - HORMONES, 996*, 1023
  - SECRETIN, 1040

PEPSINOGEN
- PEPTIC ULCER
  - DIAGNOSIS, 1224
- STOMACH
  - SECRETION, 1016
- ULCER
  - DUODENUM, 1422

PEPTIC ULCER
- SEE ALSO STOMACH ULCER, DUODENUM ULCER
- ACID SECRETION
  - HORMONE CONTROL, 999*
  - PENTAGASTRIN, 998*
  - VAGOTOMY, 997*
- BLEEDING
  - DRUG TREATMENT, 1383*, 1386*, 1428
  - PYLOROPLASTY, 1373
  - SURGERY, 1386*, 1388*, 1399, 1427, 1428
  - SURVIVAL, 1386*, 1399
  - THERAPY, 1399
  - VAGOTOMY, 1373
- BLOOD
  - GASTRIN, 1001*, 1002*
- DIAGNOSIS
  - ENDOSCOPY, 1289
  - PEPSINOGEN, 1224
- DIET, 1412
- DISEASES ASSOCIATED WITH
  - GASTRITIS, 1391*
- DRUG TREATMENT, 1022, 1412
  - ANTICHOLINERGIC AGENTS, 1392*, 1402
  - HORMONES, 995*
- ETIOLOGY
  - ANESTHESIA, 1429
  - SURGERY, 1410
- GASTRIN
  - IMMUNOLOGY, 1397
- HYPOGLYCEMIA
  - GASTRIN, 1390*
- MORPHOLOGY, 1413
- PERFORATION
  - PYLOROPLASTY, 1404
  - SURGERY, 1427
  - VAGOTOMY, 1404
- PREVENTION
  - SURGERY, 1410
- RECURRENCE, 1411, 1416, 1420
  - ANTICHOLINERGIC AGENTS, 1392*
  - PARIETAL CELL, 1389*
- SEQUELAE
  - CHOLELITHIASIS, 1869
- SIMULATION, 1410
- STOMACH
  - ACID SECRETION, 1389*, 1391*
- STRESS, 1405
- SURGERY, 1389*
  - COMPLICATIONS, 1265, 1425
  - DIARRHEA, 1384*
  - GASTRIN, 1417
  - GASTRITIS, 1396
  - MALABSORPTION, 1426
  - SEQUELAE, 1361, 1384*, 1388*, 1407, 1408, 1411, 1416, 1426, 1450, 1503
  - SMOKING, 1425
  - SURVIVAL, 1388*, 1424, 1428
  - TECHNIQUES, 1416, 1420
- VAGOTOMY
  - COMPLICATIONS, 1403

PEPTIC ULCER SURGERY
- SMALL INTESTINE
  - DISACCHARIDASE, 1450
  - LACTOSE INTOLERANCE, 1450

- PEPTIDE
  - ABSORPTION
    - MALABSORPTION, 1515
- PEPTIDES
  - SMALL INTESTINE
    - ABSORPTION, 950*
  - STOMACH
    - DISEASES, 1021
    - SECRETION, 1021
- PERFORATION
  - APPENDIX
    - COMPLICATIONS, 1575
  - ESOPHAGUS
    - EPIDEMIOLOGY, 1293*
    - NEOPLASMS, MALIGNANT, 1335
    - SURGERY, 1310, 1335
    - SURVIVAL, 1293*, 1335
  - PEPTIC ULCER
    - PYLOROPLASTY, 1404
    - SURGERY, 1427
    - VAGOTOMY, 1404
  - SMALL INTESTINE
    - CROHNS DISEASE, 1474, 1479
    - FOREIGN BODIES, 1466
- PERISTALSIS
  - ILEUM
    - DRUG EFFECTS ON, 992
- PERITONEUM
  - CECUM
    - ADHESIONS, 1523*
  - HEALING, 1930
  - NEOPLASMS, MALIGNANT, 1930
- PERITONITIS
  - AMEBIASIS, 1963
  - DIAGNOSIS
    - TECHNIQUES, 1901
  - DISEASES ASSOCIATED WITH
    - COLLAGEN DISEASES, 1901
  - SURGERY
    - SEQUALAE, 1917
- PHOSPHATASE
  - DUODENUM
    - AGE FACTORS, 1136
    - CORTICOSTEROIDS, 1136
  - LIVER
    - AGE FACTORS, 1136
    - CORTICOSTEROIDS, 1136
- PHOSPHATASE, ACID
  - LIVER
    - HYPEROXIA, 1105
- PHOSPHATASE, ALKALINE
  - LARGE INTESTINE
    - NEOPLASMS, MALIGNANT, 1549
  - LIVER DISEASE
    - DIAGNOSIS, 1246
  - SMALL INTESTINE
    - DIETARY FACTORS, 1168
    - ENZYMES, 1157*
    - MORPHOLOGY, 1161
- PHOSPHOLIPID
  - METABOLISM
    - SMALL INTESTINE, 1167
- PHOSPHORUS
  - ABSORPTION
    - LARGE INTESTINE, 956
- PHOTOTHERAPY
  - HYPERBILIRUBINEMIA, 1731
- PHYTASE
  - SMALL INTESTINE
    - ENZYMES, 1157*
- PIGMENTATION
  - LIVER
    - DUBIN-JOHNSON SYNDROME, 1726*
- PLASMA
  - SEE BLOOD
- PLASMAPHERESIS
  - LIVER COMA
    - TREATMENT, 1760*, 1764*
- POLYCYCLIC HYDROCARBONS
  - STOMACH
    - CARCINOGENESIS, 1359
- POLYPS
  - SEE ALSO NEOPLASMS, BENIGN
  - COLON, 1607
    - CHILDREN, 1598
    - COMPLICATIONS, 1576
    - FAMILIAL FACTORS, 1576, 1592, 1598
    - LYMPHATICS, 1585
    - THERAPY, 1599
  - GASTROINTESTINAL
    - FAMILIAL FACTORS, 1562
    - PROTEIN-LOSING ENTEROPATHY, 1491
  - LARGE INTESTINE
    - BIOPSY, 1517*
    - JUVENILE, 1535
    - REVIEWS, 1605
    - SURGERY, 1588
    - THERAPY, 1570
    - TISSUE CULTURE, 1517*
  - RECTUM
    - BIOPSY, 1583
    - ULTRASTRUCTURE, 1594
  - STOMACH
    - DIAGNOSIS, 1366
    - HEALING, 1368
    - MORPHOLOGY, 1368
    - SURGERY, 1368
- PORTACAVAL SHUNT
  - CARBOHYDRATE
    - METABOLISM, 1817*
  - CIRRHOSIS
    - GLUCOSE TOLERANCE, 1817*
  - SEQUELAE
    - HEMOSIDEROSIS, 1823
- PORTAL HYPERTENSION
  - CHILDREN
    - ETIOLOGY, 1940
    - SURGERY, 1940
  - DISEASES ASSOCIATED WITH, 1965

- ETIOLOGY
  - SCHISTOSOMIASIS, 1965
- LIVER
  - CIRCULATION, 1843
- PARASITES AND PARASITIC DISEASES
  - DISEASES ASSOCIATED WITH, 1951*
- SCHISTOSOMIASIS
  - DISEASES ASSOCIATED WITH, 1954
  - FIBROSIS, 1969
- SURGERY, 1843
  - CIRCULATION, 1821*
  - LIVER COMA, 1821*
  - MORTALITY, 1821*
  - TECHNIQUES, 1827, 1833

PREGNANCY
- CHOLECYSTITIS
  - THERAPY, 1868
- HEPATITIS, VIRAL, 1791
- PANCREATITIS
  - DIGNOSIS, 1654*
- STOMACH
  - SECRETION, 1238

PRESSURE STUDIES
- ACHALASIA
  - DIAGNOSIS, 1328
- ESOPHAGUS
  - DIAGNOSIS, 985
- HIRSCHSPRUNGS DISEASE
  - DIAGNOSIS, 1188*
- LIVER
  - VAGOTOMY, 1924
- RECTUM
  - ANOMALY, CONGENITAL, 1547
- STOMACH
  - VAGOTOMY, 1924

PREVENTION
- CHOLELITHIASIS
  - CHOLECYSTOKININ, 1077
- FATTY LIVER
  - DRUGS, 1121
- HEPATITIS, NONVIRAL
  - FATTY ACIDS, 1752
- HYPERBILIRUBINEMIA
  - DRUGS, 1727*
  - NEONATE, 1728*
  - SEDATIVES, 1728*
- LIVER
  - INJURY, 1114
- LIVER INJURY
  - CARBON TETRACHLORIDE, 1052*
- PEPTIC ULCER
  - SURGERY, 1410
- SURGERY
  - TRAUMA, 1752

PROCTOCOLECTOMY
- BILE ACIDS
  - METABOLISM, 1518*

PROCTOCOLITIS
- ETIOLOGY
  - ISCHEMIA, 1615*

PROLAPSE
- BILE DUCT, 1851
- ESOPHAGUS
  - MUCOSA, 1320
- RECTUM
  - SURGERY, 1564

PROSTAGLANDIN SYNTHETASE
- STOMACH
  - ENZYMES, 1005

PROSTAGLANDINS
- LIVER
  - METASTASES, 1580

PROTEASE
- ELECTROPHORESIS
  - TECHNIQUES, 1191*
- GASTRITIS
  - DIAGNOSIS, 1191*

PROTEIN
- ABSORPTION
  - EMBRYOLOGY, 946*
  - NEONATE, 955
  - SMALL INTESTINE, 955
- BLOOD
  - CIRRHOSIS, 1844
- DIAGNOSIS
  - RADIOISOTOPE, 1345*
- DIETARY FACTORS
  - LIVER, 1099
- LIVER
  - AGE FACTORS, 1055*
  - DIETARY FACTORS, 1073
  - HEREDITARY FACTORS, 1087
  - NEOPLASMS, MALIGNANT, 1085
  - SYNTHESIS, 1073
  - ULTRASTRUCTURE, 1135
- METABOLISM
  - LIVER, 1135
  - STOMACH, 1345*
- PANCREAS
  - METABOLISM, 1047
  - SECRETION, 1039, 1042, 1045
- SYNTHESIS
  - LIVER, 1055*

PROTEIN DEFICIENCY
- ABSORPTION
  - FAMILIAL FACTORS, 953
- AMINO ACIDS
  - METABOLISM, 1072
- FATTY LIVER
  - ETIOLOGY, 1072
- LIVER
  - METABOLISM, 1072
- SMALL INTESTINE
  - MORPHOLOGY, 953
- TRANSPORT
  - SMALL INTESTINE, 957

PROTEIN-LOSING ENTEROPATHY
- DISEASES ASSOCIATED WITH
  - COLLAGEN DISEASES, 1438
  - MUSCULOSKELETAL SYSTEM, 1438
- DRUG TREATMENT
  - CORTICOSTEROIDS, 1491
- GASTROINTESTINAL
  - POLYPS, 1491

PROTEIN SYNTHESIS

- LIVER
  - REGENERATION, 1102

- PROTEOLYTIC
  - ENZYMES
    - PANCREATITIS, 1656

- PROTHROMBIN
  - LIVER FUNCTION TESTS
    - TECHNIQUES, 1279

- PRURITUS
  - ETIOLOGY
    - BILE ACIDS, 1680

- PSEUDOCYST
  - PANCREAS, 1645
    - CIRCULATION, 1662
    - DIAGNOSIS, 1190*
    - METABOLISM, 1662

- PYLOROPLASTY
  - PEPTIC ULCER
    - BLEEDING, 1373
    - PERFORATION, 1404
  - SECRETION
    - HORMONE CONTROL, 1423
  - STOMACH
    - MUCOSA, 1342*
  - SURVIVAL, 1423
  - ULCER, DUODENUM
    - GASTRIN, 1394*

- PYLORUS
  - SEE ALSO STOMACH
  - MORPHOLOGY
    - EMBRYOLOGY, 921
    - NERVOUS SYSTEM, 921
  - OBSTRUCTION
    - CHOLELITHIASIS, 1881
  - STENOSIS
    - CONGENITAL, 1364
    - NEONATE, 1364
    - SURGERY, 1364

- PYRIMIDINE
  - LIVER
    - SYNTHESIS, 925

- RADIATION
  - INTESTINE
    - CELL SURVIVAL, 941
    - MORPHOLOGY, 941
  - ISOENZYMES
    - LACTATE DEHYDROGENASE, 1089
  - LARGE INTESTINE
    - INJURY, 1439
  - LIVER
    - LACTATE DEHYDROGENASE, 1089
  - SMALL INTESTINE
    - INJURY, 1439

- RADIOISOTOPE
  - PROTEIN
    - DIAGNOSIS, 1345*

- RADIOISOTOPES
  - GASTROINTESTINAL
    - DIAGNOSIS, 1286
  - STOMACH
    - DIAGNOSIS, 1278

- RADIOLOGY
  - ABDOMEN
    - ACUTE, 1918
    - DIAGNOSIS, 1242
  - ACHALASIA
    - DIAGNOSIS, 1328
  - BILIARY TRACT
    - DIAGNOSIS, 1220
  - CHOLEDOCHOLITHIASIS
    - DIAGNOSIS, 1220
  - COLITIS, PSEUDOMEMBRANOUS, 1586
  - COLON
    - DIAGNOSIS, 1284
    - DIVERTICULUM, 1531
  - DUODENUM
    - DIAGNOSIS, 1244
    - DIVERTICULUM, 1628
    - GALLBLADDER DISEASE, 1239
    - OBSTRUCTION, 1455
    - PANCREATITIS, 1239
    - STOMACH DISEASE, 1239
    - TECHNIQUES, 975*
  - ENTEROCOLITIS
    - CHILDREN, 1201
    - NEONATE, 1931
  - ESOPHAGUS
    - DIAGNOSIS, 1325, 1329, 1331, 1338
  - GALLBLADDER
    - HORMONE, 1193*
  - GASTRITIS
    - DIAGNOSIS, 1348
  - GASTROINTESTINAL
    - DIAGNOSIS, 990, 1894
  - HERNIA, HIATUS
    - DISEASES ASSOCIATED WITH, 1320
  - ILEUS
    - DIAGNOSIS, 1205
  - INTESTINE
    - OBSTRUCTION, 1205
  - JAUNDICE
    - DIAGNOSIS, 1222
  - JAUNDICE, OBSTRUCTIVE
    - DIAGNOSIS, 1220
  - LACTOSE
    - INTOLERANCE, 1458
  - LARGE INTESTINE, 1529
    - ISCHEMIA, 1528
    - TRANSPLANTATION, 1316
  - LIVER
    - ABSCESS, 1236
    - DIAGNOSIS, 1222
  - PANCREAS
    - NEOPLASMS, MALIGNANT, 1628
  - PANCREAS DISEASE
    - DIAGNOSIS, 1261
  - PANCREATITIS
    - DIAGNOSIS, 1237
  - SMALL INTESTINE, 1458
    - CROHNS DISEASE, 1471
    - HORMONE, 1192*
    - OBSTRUCTION, 1456
    - TRANSPLANTATION, 1316
  - STOMACH
    - DIAGNOSIS, 1255, 1274, 1363
    - SECRETION, 1238
    - TECHNIQUES, 1352

- ULCER, 1419
- VOLVULUS, 1370

RADIOTHERAPY
- ESOPHAGUS
  - NEOPLASMS, MALIGNANT, 1327
- LIVER
  - NEOPLASMS, MALIGNANT, 1216
- RECTUM
  - MUCOSA, 1566

RECTUM
- SEE ALSO LARGE INTESTINE
- ANOMALY, CONGENITAL
  - PRESSURE STUDIES, 1547
- BLEEDING
  - DIAGNOSIS, 1593, 1603
  - THERAPY, 1603
- CARCINOID, 1580, 1613
- DIAGNOSIS, 1251
- ENDOSCOPY
  - COMPLICATIONS, 1583
- MUCOSA
  - RADIOTHERAPY, 1566
- NEOPLASMS, BENIGN, 1568
  - ALKALOSIS, 1565
- NEOPLASMS, MALIGNANT
  - CROHNS DISEASE, 1473
  - ENDOSCOPY, 1210
  - IMMUNOLOGY, 1905
  - METASTASES, 1569
  - SURGERY, 1589
  - SURVIVAL, 1608
- PAIN
  - FAMILIAL FACTORS, 1601
- POLYPS
  - BIOPSY, 1583
  - ULTRASTRUCTURE, 1594
- PROLAPSE
  - SURGERY, 1564

RECURRENCE
- COLON
  - NEOPLASMS, MALIGNANT, 1595
- CROHNS DISEASE, 1477
  - SURGERY, 1469*
- PEPTIC ULCER, 1411, 1416, 1420
  - ANTICHOLINERGIC AGENTS, 1392*
  - PARIETAL CELL, 1389*

REFLUX
- ESOPHAGUS
  - DIAGNOSIS, 1300
  - ESOPHAGITIS, 1300
  - HERNIA, HIATUS, 1300
- STOMACH DISEASE
  - ACID SECRETION, 1027

REGENERATION
- LIVER
  - AGE FACTORS, 1082
  - AMINO ACIDS, 1131
  - ANGIOGRAPHY, 1084
  - CIRCULATION, 1116
  - CIRRHOSIS, 1061*
  - CORTICOSTEROIDS, 1116
  - DRUG EFFECTS ON, 1061*
  - ENZYMES, 1074, 1097
  - HORMONE CONTROL, 1059*
  - METABOLISM, 1074
  - MITOSIS, 1059*
  - NUCLEIC ACIDS, 1113, 1131
  - PROTEIN SYNTHESIS, 1102

REGIONAL ENTERITIS
- SEE ALSO ENTERITIS

RENIN
- KWASHIORKOR, 1494

RESPIRATORY SYSTEM
- ECHINOCOCCOSIS
  - DISEASES ASSOCIATED WITH, 1952
- ESOPHAGITIS, REFLUX
  - DISEASES ASSOCIATED WITH, 1309
- PANCREATITIS
  - DISEASES ASSOCIATED WITH, 1655
- PARASITES AND PARASITIC DISEASES
  - DISEASES ASSOCIATED WITH, 1964

RETROPERITONEAL
- TENIASIS, 1959

REVIEWS
- ANTIGEN, AUSTRALIA
  - HEPATITIS, 1785
- BILE ACIDS
  - MALABSORPTION, 1854
  - PHYSICAL PROPERTIES, 1854
- BILIRUBIN, 1733
- CHOLELITHIASIS
  - ILEUS, 1863
- COLON, IRRITABLE, 1559
- CROHNS DISEASE, 1476, 1483, 1619
- DIARRHEA
  - ETIOLOGY, 1912, 1926
- ESOPHAGUS
  - ATRESIA, 1299
  - DIAGNOSIS, 1243
- GASTRIN, 1020
- GASTROENTERITIS
  - ETIOLOGY, 1926
- GASTROINTESTINAL
  - DIAGNOSIS, 1286
  - HORMONE, 1943
  - HORMONE CONTROL, 1175
  - NEOPLASMS, MALIGNANT, 1888, 1895
- GIARDIASIS, 1961
- HEPATITIS, NONVIRAL
  - DRUG TOXICITY, 1753
- HEPATITIS, VIRAL, 1783
- INTESTINE
  - OBSTRUCTION, 1461
- LACTOSE INTOLERANCE
  - EPIDEMIOLOGY, 1511
- LARGE INTESTINE, 1579
  - OBSTRUCTION, 1532
  - POLYPS, 1605
- LIVER
  - DRUG METABOLISM, 1753
- LIVER DISEASE
  - BILE ACIDS, 1689
- LIVER DISEASE, ALCOHOLIC
  - THERAPY, 1812
- LIVER FUNCTION TESTS, 1277
- MALABSORPTION
  - CHILDREN, 1499, 1508
  - SIMULATION, 1500

- PANCREAS, 1650
  - ENZYMES, 1041
  - SCANNING, SCINTILLATION, 1247
  - SURGERY, 1642
- PANCREAS DISEASE
  - DIAGNOSIS, 1634
- PANCREATITIS
  - DIAGNOSIS, 1669
- SHORT BOWEL SYNDROME
  - SURGERY, 1459
- ULCERATIVE COLITIS, 1541, 1619

RIBOSOMES
- LIVER
  - ISOLATION, 922

RUPTURE
- ANEURYSM
  - PANCREAS, 1636
- ESOPHAGUS
  - COMPLICATIONS, 1294*
  - DIAGNOSIS, 1252
- GALLBLADDER
  - CHILDREN, 1865
- STOMACH, 1380

SALIVARY GLANDS
- SECRETION
  - AMYLASE, 1032*

SALMONELLOSIS
- LIVER
  - ABSCESS, 1749
- PANCREAS
  - ABSCESS, 1670

SARCOIDOSIS
- PANCREAS, 1648

SCANNING, SCINTILLATION
- BILIARY TRACT
  - NEOPLASMS, 1187*
  - OBSTRUCTION, 1266
- DUODENUM
  - NEOPLASMS, 1187*
- LIVER
  - ABSCESS, 1236
  - CYSTIC FIBROSIS, 1699
  - CYSTS, 1708
  - DIAGNOSIS, 1195*, 1249
  - HEMATOMA, 1263
  - LIVER DISEASE, 1230
  - NEOPLASMS, MALIGNANT, 1200, 1216
  - TRAUMA, 1263
- LIVER DISEASES
  - DIAGNOSIS, 1199, 1218, 1225
- PANCREAS
  - DIAGNOSIS, 1254
  - NEOPLASMS, 1187*
  - REVIEWS, 1247
  - TECHNIQUES, 1190*
- PANCREAS DISEASE
  - DIAGNOSIS, 1241, 1261
- PANCREATITIS
  - DIAGNOSIS, 1190*

SCHISTOSOMIASIS
- DISEASES ASSOCIATED WITH
  - FIBROSIS, 1969
  - PORTAL HYPERTENSION, 1954
- DRUG TREATMENT
  - COMPLICATIONS, 1953
- LIVER
  - CIRCULATION, 1967
  - FIBROSIS, 1967
- LIVER DISEASES
  - ETIOLOGY, 1965
- PANCREAS
  - MORPHOLOGY, 1954
- PORTAL HYPERTENSION
  - ETIOLOGY, 1965
  - FIBROSIS, 1969

SCLERODERMA
- CIRRHOSIS
  - DISEASES ASSOCIATED WITH, 1835

SECRETIN
- PANCREAS
  - SECRETION, 1040, 1233, 1281
- STOMACH
  - ACID SECRETION, 1040
  - PEPSIN, 1040

SECRETION
- ANEMIA, PERNICIOUS
  - CHEMICAL COMPOSITION, 1883*
- BILE
  - CHOLERETIC AGENTS, 1132, 1147
  - CIRCULATION, 1133
  - ION TRANSPORT, 1147
  - LAXATIVES, 1743
  - MARKER STUDIES, 1184
- GASTROINTESTINAL
  - HORMONE CONTROL, 1175
- JEJUNUM
  - ESCHERICHIA COLI, 1153*
- LIVER
  - ANTIBIOTICS, 1051*
  - TRIGLYCERIDE, 1051*, 1130
- PANCREAS, 1036*
  - AMINO ACIDS, 1045
  - AMYLASE, 1032*, 1039, 1044
  - BICARBONATE, 1040, 1045, 1281
  - CALCIUM, 1034*
  - CHEMICAL COMPOSITION, 1050
  - CHOLINERGIC AGENTS, 1042
  - CYCLIC ADENOSINE MONOPHOSPHATE, 1033*, 1034*
  - DIABETES, 1044
  - DIETARY FACTORS, 1042, 1050
  - ENZYMES, 1040
  - HORMONE CONTROL, 1039, 1635, 1643
  - HORMONE EFFECTS ON, 1013, 1395*
  - INSULIN, 1044
  - NERVOUS CONTROL, 1039, 1643
  - PANCREOZYMIN, 1033*, 1233
  - PROTEIN, 1039, 1042, 1045
  - SECRETIN, 1040, 1233, 1281
  - SECRETION, 1033*
  - SMOKING, 1037*
  - TRYPSIN, 1038
  - TRYPSINOGEN, 1038
  - VAGOTOMY, 1395*
- PANCREAS DISEASE, 1643
- PEPSIN

    - DRUG EFFECTS ON, 1398
  - PYLOROPLASTY
    - HORMONE CONTROL, 1423
  - SALIVARY GLANDS
    - AMYLASE, 1032*
  - SMALL INTESTINE
    - ESCHERICHIA COLI, 1153*
  - STOMACH
    - ACID SECRETION, 1016
    - CIRCULATION, 1182
    - CYCLIC ADENOSINE MONOPHOSPHATE, 994*
    - DIETARY FACTORS, 1008
    - DRUG EFFECTS ON, 994*, 996*
    - ELECTROLYTE, 1016
    - HORMONE CONTROL, 1000*
    - HORMONE EFFECTS ON, 1013
    - HORMONES, 996*
    - LACTATE DEHYDROGENASE, 1194*
    - MARKER STUDIES, 1184
    - PEPSINOGEN, 1016
    - PEPTIDES, 1021
    - PREGNANCY, 1238
    - RADIOLOGY, 1238
    - ZOLLINGER-ELLISON SYNDROME, 1890
  - VAGOTOMY
    - HORMONE CONTROL, 1423
  - ZOLLINGER-ELLISON SYNDROME
    - CHEMICAL COMPOSITION, 1883*

- SEDATIVES
  - BILIRUBIN
    - METABOLISM, 1736
  - CHOLESTASIS
    - DRUG TREATMENT, 1676*
  - HYPERBILIRUBINEMIA
    - NEONATE, 1736
    - PREVENTION, 1728*
  - LIVER
    - BIOPSY, 1276
  - METABOLISM
    - HEPATITIS, VIRAL, 1778
  - SMALL INTESTINE
    - ULTRASTRUCTURE, 910*

- SEPSIS
  - GASTROINTESTINAL
    - BLEEDING, 1938

- SEQUALAE
  - SURGERY, 1920
    - PERITONITIS, 1917

- SERUM
  - SEE BLOOD
  - GASTRIN
    - NERVOUS CONTROL, 1390*

- SEX FACTORS
  - DUODENUM
    - ULCER, 1409
  - GALLBLADDER
    - DISEASES, 1859
  - GASTROENTERITIS, 1928
  - LIVER
    - ABSCESS, 1968
  - LIVER INJURY, 1093
  - METABOLISM
    - ASPIRIN, 1910
  - STOMACH
    - MOTILITY, 986

- SHOCK
  - JEJUNUM
    - CIRCULATION, 1923
    - MORPHOLOGY, 1923

- SHORT BOWEL SYNDROME
  - SURGERY
    - REVIEWS, 1459

- SHWACHMAN SYNDROME, 1633

- SIGMOID
  - SEE ALSO LARGE INTESTINE
  - DIVERTICULUM, 1591
  - NEOPLASMS, MALIGNANT
    - COLITIS, 1609
  - OBSTRUCTION
    - ENDOMETRIOSIS, 1574

- SMALL INTESTINE
  - SEE ALSO DUODENUM, JEJUNUM, ILEUM
  - SEE ALSO INTESTINE
  - ABSORPTION, 972
    - AMINO ACIDS, 950*
    - BILE ACIDS, 944*
    - CHOLECYSTOKININ, 965
    - CHOLERA, 967
    - DRUGS, 944*
    - EMBRYOLOGY, 946*
    - ENZYMES, 1156*
    - GALACTOSE, 952
    - GLUCOSE, 951, 962
    - IRON, 910*
    - LACTOSE, 1450
    - NEONATE, 953
    - PEPTIDES, 950*
    - PROTEIN, 955
    - SUGAR, 965
    - TECHNIQUES, 951, 962, 964
    - TRIGLYCERIDES, 915*
    - URINE, 970
    - VITAMIN B12, 947*, 948*, 959
    - VITAMIN E, 943*
    - WATER, 952
  - AMYLOIDOSIS, 1904
  - ANOMALY, CONGENITAL
    - ATRESIA, 1435
    - STENOSIS, 1435
  - BACTERIA
    - VITAMIN B12, 1154*
  - BIOPSY
    - TECHNIQUES, 1445
  - CARBOHYDRATE
    - METABOLISM, 1158*
  - CIRCULATION
    - NERVOUS CONTROL, 1182
  - CROHNS DISEASE
    - RADIOLOGY, 1471
  - DIAGNOSIS
    - BIOPSY, 1207
    - ENDOSCOPY, 1256
  - DISACCHARIDASE
    - PEPTIC ULCER SURGERY, 1450
  - DIVERTICULUM
    - MORPHOLOGY, 1441
  - ENZYMES, 910*

  CHEMICAL PROPERTIES, 1156*, 1167
  DIARRHEA, 1457
  ISCHEMIA, 1448
  MALNUTRITION, 1166
  PHOSPHATASE, ALKALINE, 1157*
  PHYTASE, 1157*
FLORA
  CROHNS DISEASE, 1470*
  VAGOTOMY, 1384*
IMMUNOGLOBULINS
  GIARDIASIS, 1949*
IMMUNOLOGY
  CELIAC DISEASE, 1488*
  GLUTEN, 1488*
  SPECIES DIFFERENCES, 963
  STRONGYLOIDIASIS, 932
INJURY
  RADIATION, 1439
ION TRANSPORT
  DIARRHEA, 1887*
ISCHEMIA
  OXYGEN, 1448
LACTOSE INTOLERANCE
  PEPTIC ULCER SURGERY, 1450
LYMPH
  IODINE, 1169
METABOLISM
  LIPIDS, 912*
  STEROIDS, 912*
MITOCHONDRIA
  DIETARY FACTORS, 914*
MORPHOLOGY, 1434
  ADENOSINE TRIPHOSPHATASE, 1161
  CELIAC DISEASE, 1503
  DIARRHEA, 1457
  DIET, 1501
  ENTEROPEPTIDASE, 1155*
  GLUTEN, 1501
  MALABSORPTION, 1510
  MALNUTRITION, 1166
  PHOSPHATASE, ALKALINE, 1161
  PROTEIN DEFICIENCY, 953
  STRONGYLOIDIASIS, 932
MOTILITY
  BIOPOTENTIALS, 973*, 980*
  DRUG EFFECTS ON, 984
  HORMONE CONTROL, 973*, 980*
  NERVOUS CONTROL, 984
  SIMULATION, 976*
  TECHNIQUES, 976*
MUCOSA
  CHILDREN, 1444
  MORPHOLOGY, 1444, 1445
NECROSIS
  ETIOLOGY, 1561
NEOPLASMS, BENIGN, 1460
  DIAGNOSIS, 1442, 1465
NEOPLASMS, MALIGNANT
  DIAGNOSIS, 1442, 1465
  DISEASES ASSOCIATED WITH, 1467*
NUCLEIC ACIDS
  SYNTHESIS, 1164
OBSTRUCTION, 1433
  CIRCULATION, 1463
  COMPLICATIONS, 1463
  DIAGNOSIS, 1456
  ENDOMETRIOSIS, 1454
  RADIOLOGY, 1456
PERFORATION
    CROHNS DISEASE, 1474, 1479
    FOREIGN BODIES, 1466
  PHOSPHATASE, ALKALINE
    DIETARY FACTORS, 1168
  PHOSPHOLIPID
    METABOLISM, 1167
  RADIOLOGY, 1458
    HORMONE, 1192*
  SECRETION
    ESCHERICHIA COLI, 1153*
  STRANGULATION
    SURGERY, 1443
  SURGERY
    ABSORPTION, 959
    FOREIGN BODIES, 1466
    METABOLISM, 1158*
  TRANSPLANTATION
    RADIOLOGY, 1316
  TRANSPORT
    AMINO ACIDS, 957
    AUTORADIOGRAPHY, 963
    DIETARY FACTORS, 957
    GLUCOSE, 969
    PROTEIN DEFICIENCY, 957
  ULTRASTRUCTURE, 915*
    DIETARY FACTORS, 914*
    SEDATIVES, 910*
  VOLVULUS, 1433

SMOKING
  PANCREAS
    SECRETION, 1037*
  PEPTIC ULCER
    SURGERY, 1425

SONOGRAPHY
  SEE ECHOGRAPHY

SPECIES DIFFERENCES
  IMMUNOLOGY
    SMALL INTESTINE, 963
  KININ
    METABOLISM, 1162
  LIVER
    LIPIDS, 1112

SPHINCTER
  ANUS
    DIAGNOSIS, 1251

STASIS
  BILE
    CHOLELITHIASIS, 1077

STASIS SYNDROME
  JEJUNUM
    FATTY ACIDS, 1485*

STEATORRHEA
  DIAGNOSIS
    MARKER STUDIES, 1219
  LIVER DISEASE
    DISEASES ASSOCIATED WITH, 1487*

STEATOSIS
  SEE FATTY LIVER

STENOSIS
  ESOPHAGUS

    - DILATATION, 1292*
    - DRUG TREATMENT, 1292*
    - SURGERY, 1316
  - PANCREATIC DUCT
    - ENDOSCOPY, 1196*
  - PYLORUS
    - CONGENITAL, 1364
    - NEONATE, 1364
    - SURGERY, 1364
  - SMALL INTESTINE
    - ANOMALY, CONGENITAL, 1435

- STEROIDS
  - HEMMORHOIDS, 1596
  - LIVER
    - METABOLISM, 1053*
  - SMALL INTESTINE
    - METABOLISM, 912*

- STEROL
  - METABOLISM, 1929

- STOMACH
  - SEE ALSO ANTRUM, PYLORUS
  - ABSORPTION, 972
    - ALCHOHOL, 1000*
    - CHOLINE, 1000*
  - ACID SECRETION, 1344*
    - ADRENERGIC AGENTS, 1004
    - ADRENERGIC BLOCKING AGENTS, 1004
    - ANTRECTOMY, 1010
    - CALCIUM, 1029, 1344*
    - CHOLINERGIC AGENTS, 1398
    - CIRCADIAN RHYTHM, 1341*
    - CYCLIC ADENOSINE MONOPHOSPHATE, 1011
    - 2-DEOXY-D-GLUCOSE, 1248
    - DIETARY FACTORS, 1007, 1019
    - ENDOCRINE SYSTEM, 1030
    - GASTRIN, 1344*, 1394*
    - GASTRITIS, 1391*
    - GLUCAGON, 1017
    - HISTAMINE, 1012
    - HORMONE CONTROL, 1029
    - HORMONES, 995*, 1006, 1023, 1025, 1026, 1030
    - HYPOGLYCEMIA, 1018, 1019, 1031
    - INSULIN, 1031, 1245, 1248
    - NERVOUS CONTROL, 997*, 1018, 1024, 1248
    - PENTAGASTRIN, 1128, 1393*
    - PEPTIC ULCER, 1389*, 1391*
    - SECRETIN, 1040
    - SECRETION, 1016
    - STRESS, 1385*
    - TECHNIQUES, 1026, 1028, 1265, 1273
    - ULCER, DUODENUM, 1393*, 1430
    - ULCER, STOMACH, 1430
    - VAGOTOMY, 1009, 1400
  - ANOMALY
    - DIAGNOSIS, 1377
    - MORPHOLOGY, 1377
  - BIOPOTENTIALS
    - HORMONES, 1025
  - BIOPSY
    - GASTRITIS, 1275
  - BLEEDING
    - DIAGNOSIS, 1371
    - NEOPLASMS, BENIGN, 1372
    - PANCREATITIS, 1666
  - CARCINOGENESIS
    - DIETARY FACTORS, 1008
    - POLYCYCLIC HYDROCARBONS, 1359
  - CHEMICAL BURNS
    - GASTRECTOMY, 1378
  - CIRCULATION
    - NERVOUS CONTROL, 1182
    - STRESS, 1170*
  - CYCLIC ADENOSINE MONOPHOSPHATE
    - CIRCADIAN RHYTHM, 1341*
  - DIAGNOSIS
    - ACID SECRETION, 1271
    - BIOPSY, 1207, 1271
    - CYTOLOGY, 1255
    - ENDOSCOPY, 1255, 1274, 1289, 1290, 1352
    - RADIOISOTOPES, 1278
    - RADIOLOGY, 1255, 1274, 1363
  - DISEASES
    - EPIDEMIOLOGY, 1352
    - PEPTIDES, 1021
  - DISEASES ASSOCIATED WITH
    - UROGENITAL SYSTEM, 931
  - ELECTROLYTE
    - HISTAMINE, 1012
    - SECRETION, 1016
  - ENDOCRINE SYSTEM
    - GASTRITIS, 1340*
    - ZOLLINGER-ELLISON SYNDROME, 1346*
  - ENDOSCOPY
    - COMPLICATIONS, 1206
  - ENZYMES
    - PROSTAGLANDIN SYNTHETASE, 1005
  - FISTULA
    - DIAGNOSIS, 1358
    - SURGERY, 1358
  - FOREIGN BODIES
    - VOMITING, 1360
  - HAMARTOMA, 1355
  - ION TRANSPORT
    - BIOPOTENTIALS, 961
    - HEIDENHAIN POUCH, 949*
  - MENETRIERS DISEASE
    - METABOLISM, 1345*
  - MORPHOLOGY, 939
    - AGE FACTORS, 934
    - AUTORADIOGRAPHY, 931
    - CARCINOGENESIS, 1359
    - CHOLINESTERASE, 924
    - NERVOUS SYSTEM, 924
  - MOTILITY
    - DRUG EFFECTS ON, 986, 1406
    - HORMONES, 1025
    - MARKER STUDIES, 1184
    - SEX FACTORS, 986
    - VAGOTOMY, 1400, 1406
  - MUCOSA
    - ENZYMES, 1014
    - MITOSIS, 1342*
    - MUCOPOLYSACCHARIDE, 1014
    - PYLOROPLASTY, 1342*
    - VAGOTOMY, 1014, 1342*
  - MUCUS
    - ZOLLINGER-ELLISON SYNDROME, 1890
  - NECROSIS
    - GASTRECTOMY, 1378
  - NEOPLASMS, BENIGN, 1353
    - ADOLESCENTS, 1351

  - CHILDREN, 1347
  - DIAGNOSIS, 1351, 1357
  - SURGERY, 1347
  - THERAPY, 1357
- NEOPLASMS, MALIGNANT, 1367
  - AGE FACTORS, 1369
  - DIAGNOSIS, 1278, 1289, 1290, 1343*, 1350, 1352, 1363, 1366, 1374
  - DISEASES ASSOCIATED WITH, 1343*, 1349, 1356, 1379
  - DRUG TREATMENT, 1933
  - ENDOSCOPY, 1215
  - EPIDEMIOLOGY, 1356
  - ETIOLOGY, 1381
  - EXFOLIATIVE CYTOLOGY, 1215
  - IMMUNOLOGY, 1375
  - LACTATE DEHYDROGENASE, 1194*
  - METASTASES, 1366, 1933
  - METASTASIS, 1371
  - SURGERY, 1350
  - SURVIVAL, 1343*, 1350, 1381
  - THERAPY, 1356
- NUCLEIC ACIDS
  - PENTAGASTRIN, 993
- PEPSIN
  - DRUG EFFECTS ON, 996*, 1022
  - HISTAMINE, 1012
  - HORMONES, 996*, 1023
  - SECRETIN, 1040
- PEPSINOGEN
  - SECRETION, 1016
- POLYPS
  - DIAGNOSIS, 1366
  - HEALING, 1368
  - MORPHOLOGY, 1368
  - SURGERY, 1368
- PRESSURE STUDIES
  - VAGOTOMY, 1924
- PROTEIN
  - METABOLISM, 1345*
- RADIOLOGY
  - TECHNIQUES, 1352
- RUPTURE, 1380
- SECRETION
  - CIRCULATION, 1182
  - CYCLIC ADENOSINE MONOPHOSPHATE, 994*
  - DIETARY FACTORS, 1008
  - DRUG EFFECTS ON, 994*, 996*
  - HORMONE CONTROL, 1000*
  - HORMONE EFFECTS ON, 1013
  - HORMONES, 996*
  - LACTATE DEHYDROGENASE, 1194*
  - MARKER STUDIES, 1184
  - PEPTIDES, 1021
  - PREGNANCY, 1238
  - RADIOLOGY, 1238
  - ZOLLINGER-ELLISON SYNDROME, 1890
- SURGERY
  - COMPLICATIONS, 1421
- ULCER
  - DIAGNOSIS, 1419
  - DISEASES ASSOCIATED WITH, 1414, 1424
  - DRUG TREATMENT, 1415
  - RADIOLOGY, 1419
- VOLVULUS, 1563
  - NEONATE, 1370
  - RADIOLOGY, 1370
    - SURGERY, 1370

- STOMACH DISEASE
  - ACID SECRETION
    - REFLUX, 1027
  - DUODENUM
    - RADIOLOGY, 1239

- STOMACH ULCER
  - SEE ALSO PEPTIC ULCER

- STRANGULATION
  - SMALL INTESTINE
    - SURGERY, 1443

- STRESS
  - PEPTIC ULCER, 1405
  - STOMACH
    - ACID SECRETION, 1385*
    - CIRCULATION, 1170*
  - ULCER
    - SIMULATION, 1385*

- STRICTURE
  - BILE DUCT
    - SURGERY, 1861
  - ESOPHAGUS
    - DILATATION, 1315

- STRONGYLOIDIASIS
  - SMALL INTESTINE
    - IMMUNOLOGY, 932
    - MORPHOLOGY, 932

- SUGAR
  - ABSORPTION
    - SMALL INTESTINE, 965

- SULFOBROMOPHTHALEIN
  - LIVER FUNCTION TESTS
    - TECHNIQUES, 1283

- SULFOBROMOPHTHALEIN TEST
  - DIABETES, 1203

- SURGERY
  - ABDOMEN
    - ACUTE, 1920, 1921
  - ANUS
    - FISSURE, 1602
    - INCONTINENCE, 1538
  - BILE DUCT
    - NEOPLASMS, MALIGNANT, 1701
    - STRICTURE, 1861
  - BILIARY TRACT, 1856
    - ATRESIA, 1841
    - COMPLICATIONS, 1878
    - NEOPLASMS, MALIGNANT, 1651, 1860, 1875
    - TECHNIQUES, 1133
  - CHOLECYSTITIS, 1864
  - CHOLEDOCHOLITHIASIS, 1874
    - TECHNIQUES, 1862
  - CHOLELITHIASIS, 1876
  - COLON
    - ANOMALY, CONGENITAL, 1324
    - COMPLICATIONS, 1552
    - DIVERTICULUM, 977*
    - MOTILITY, 977*

  SURVIVAL, 1552
  TECHNIQUES, 1551
CROHNS DISEASE
  IMMUNOLOGY, 1616*
  RECURRENCE, 1469*
DIARRHEA
  THERAPY, 1365
DUMPING SYNDROME
  TECHNIQUES, 1361
  THERAPY, 1365
DUODENUM
  COMPLICATIONS, 1421
  NEOPLASMS, MALIGNANT, 1651
  TRAUMA, 1629
  ULCER, 1420
ESOPHAGITIS, REFLUX, 1309, 1311
  COMPLICATIONS, 1307
ESOPHAGUS
  ANOMALIES, 1319
  ANOMALY, CONGENITAL, 1324
  COMPLICATIONS, 1333
  DIVERTICULUM, 1325
  NEOPLASMS, 1326
  NEOPLASMS, BENIGN, 1314
  NEOPLASMS, MALIGNANT, 1295, 1327, 1336
  PAIN, 985
  PERFORATION, 1310, 1335
  STENOSIS, 1316
  SURVIVAL, 1318, 1326, 1336
  TECHNIQUES, 1326, 1336
  TRANSPLANTATION, 1333
  TRAUMA, 1310
GASTRITIS
  ETIOLOGY, 1408
HERNIA, HIATUS, 1302, 1323
  COMPLICATIONS, 1339
  TECHNIQUES, 1339
HIRSCHSPRUNGS DISEASE, 1533, 1597
JAUNDICE, OBSTRUCTIVE, 1860
LARGE INTESTINE, 1537, 1542
  ANTIBIOTICS, 1530
  NEOPLASMS, MALIGNANT, 1536
  POLYPS, 1588
LIVER
  ANOMALY, CONGENITAL, 1856
  CIRCULATION, 1174
  NEOPLASMS, MALIGNANT, 1710
  TECHNIQUES, 1685
  TRAUMA, 1702
LIVER DISEASE
  TREATMENT, 1717
NERVOUS SYSTEM
  PANCREATITIS, 1673
PANCREAS
  NECROSIS, 1640
  NEOPLASMS, MALIGNANT, 1647, 1651
  REVIEWS, 1642
  TRAUMA, 1629
PANCREATITIS, 1647
  PANCREATECTOMY, 1668
PEPTIC ULCER, 1389*
  BLEEDING, 1386*, 1388*, 1399, 1427, 1428
  COMPLICATIONS, 1265, 1425
  DIARRHEA, 1384*
  ETIOLOGY, 1410
  GASTRIN, 1417
  GASTRITIS, 1396
  MALABSORPTION, 1426
  PERFORATION, 1427
  PREVENTION, 1410
  SEQUELAE, 1361, 1384*, 1388*, 1407, 1408, 1411, 1416, 1426, 1450, 1503
  SMOKING, 1425
  SURVIVAL, 1388*, 1424, 1428
  TECHNIQUES, 1416, 1420
PORTAL HYPERTENSION, 1843
  CHILDREN, 1940
  CIRCULATION, 1821*
  LIVER COMA, 1821*
  MORTALITY, 1821*
  TECHNIQUES, 1827, 1833
PYLORUS
  STENOSIS, 1364
RECTUM
  NEOPLASMS, MALIGNANT, 1589
  PROLAPSE, 1564
SEQUALAE, 1920
  PERITONITIS, 1917
SHORT BOWEL SYNDROME
  REVIEWS, 1459
SMALL INTESTINE
  ABSORPTION, 959
  FOREIGN BODIES, 1466
  METABOLISM, 1158*
  STRANGULATION, 1443
STOMACH
  COMPLICATIONS, 1421
  FISTULA, 1358
  NEOPLASMS, BENIGN, 1347
  NEOPLASMS, MALIGNANT, 1350
  POLYPS, 1368
  VOLVULUS, 1370
TECHNIQUES
  CIRRHOSIS, 1818*
TRAUMA
  PREVENTION, 1752
ULCER
  DUODENUM, 1390*, 1425
ULCER, DUODENUM
  ACID SECRETION, 1398
ULCERATIVE COLITIS, 1622
  IMMUNOLOGY, 1616*
VAGOTOMY
  SEQUELAE, 1365
ZOLLINGER-ELLISON SYNDROME
  SURVIVAL, 1885*

SURVIVAL
  COLON
    SURGERY, 1552
  ESOPHAGUS
    ABSCESS, 1338
    NEOPLASMS, MALIGNANT, 1295
    PERFORATION, 1293*, 1335
    SURGERY, 1318, 1326, 1336
  GALLBLADDER
    DISEASES, 1859
    NEOPLASMS, MALIGNANT, 1857, 1867
  GASTROINTESTINAL
    BLEEDING, 1941
  ILEUS
    THERAPY, 1966
  LARGE INTESTINE
    ISCHEMIA, 1932
  LIVER

    TRANSPLANTATION, 1104
  PANCREAS
    NEOPLASMS, MALIGNANT, 1381
  PEPTIC ULCER
    BLEEDING, 1386*, 1399
    SURGERY, 1388*, 1424, 1428
  PYLOROPLASTY, 1423
  RECTUM
    NEOPLASMS, MALIGNANT, 1608
  STOMACH
    NEOPLASMS, MALIGNANT, 1343*, 1350, 1381
  VAGOTOMY, 1423
  ZOLLINGER-ELLISON SYNDROME
    SURGERY, 1885*

SYPHILIS
  HEPATITIS
    DISEASES ASSOCIATED WITH, 1740*
  PANCREAS
    CIRRHOSIS, 1630

TEMPERATURE
  ESOPHAGUS
    DIETARY FACTORS, 1321

TENIASIS
  RETROPERITONEAL, 1959

THERAPY
  SEE ALSO SPECIFIC THERAPEUTIC METHODS AND AGENTS
  ANEMIA, PERNICIOUS
    VITAMIN B12, 1163
  CHOLECYSTITIS
    PREGNANCY, 1868
  CHOLEDOCHOLITHIASIS, 1846*
  COLON
    POLYPS, 1599
  CROHNS DISEASE, 1471
  DIARRHEA
    NEONATE, 1889
    SURGERY, 1365
  DIVERTICULUM, MECKELS
    NEOPLASMS, BENIGN, 1446
  DUMPING SYNDROME
    SURGERY, 1365
  ESOPHAGUS
    BLEEDING, 1838
    BURNS, 1303
    NEOPLASMS, MALIGNANT, 1304
  ILEUS
    SURVIVAL, 1966
  LARGE INTESTINE
    CROHNS DISEASE, 1582
    POLYPS, 1570
  LIVER DISEASE, ALCOHOLIC, 1811
    REVIEWS, 1812
  PANCREAS
    TRAUMA, 1632
  PANCREATIC DUCT
    OBSTRUCTION, 1644
  PANCREATITIS, 1660, 1663
    ANTIENZYMES, 1659
    DIALYSIS, 1658
    GLUCAGON, 1667
  PEPTIC ULCER
    BLEEDING, 1399
  RECTUM
    BLEEDING, 1603
  STOMACH
    NEOPLASMS, BENIGN, 1357
    NEOPLASMS, MALIGNANT, 1356
  ZOLLINGER-ELLISON SYNDROME, 1344*

TISSUE CULTURE
  LARGE INTESTINE
    NEOPLASMS, MALIGNANT, 1517*
    POLYPS, 1517*
  LIVER
    DRUG TOXICITY, 1743

TOXIN
  CHOLERA
    DIAGNOSIS, 1197*

TOXOPLASMOSIS
  MESENTERY, 1956
  TRANSMISSION, 1956

TRACER STUDIES
  LIVER DISEASE
    DIAGNOSIS, 1218

TRANQUILIZERS
  BILE
    METABOLISM, 1698
  CIRRHOSIS, 1840
  HYPERCHLORHYDRIA
    DRUG TREATMENT, 1382
  LIVER FUNCTION TESTS, 1119

TRANSFERRIN
  KWASHIORKOR
    DIAGNOSIS, 1946

TRANSFUSION
  HEPATITIS
    TRANSMISSION, 1780
    TREATMENT, 1686
  HEPATITIS, SERUM
    TRANSMISSION, 1776
  HEPATITIS, VIRAL
    TREATMENT, 1767
  LIVER COMA
    TREATMENT, 1771, 1774

TRANSPLANTATION
  ESOPHAGUS
    SURGERY, 1333
  LARGE INTESTINE
    COMPLICATIONS, 1318
    RADIOLOGY, 1316
  LIVER
    CIRCULATION, 1100
    COMPLICATIONS, 1410
    IMMUNOSUPPRESSION, 1104, 1706
    SURVIVAL, 1104
  PANCREAS
    TECHNIQUES, 1048
  SMALL INTESTINE
    RADIOLOGY, 1316

TRANSPORT
  BILIRUBIN
    HORMONE CONTROL, 1054*
  GLUCOSE
    HORMONE CONTROL, 969

- OXYGEN, 969
- SMALL INTESTINE
  - AMINO ACIDS, 957
  - AUTORADIOGRAPHY, 963
  - DIETARY FACTORS, 957
  - GLUCOSE, 969
  - PROTEIN DEFICIENCY, 957

TRAUMA
- BILIARY TRACT
  - HEMOBILIA, 1870
- DUODENUM
  - BIOPSY, 1440
  - SURGERY, 1629
- ESOPHAGUS
  - SURGERY, 1310
- LARGE INTESTINE
  - ETIOLOGY, 1557
- LIVER
  - CIRCULATION, 1180
  - SCANNING, SCINTILLATION, 1263
  - SIMULATION, 1101
  - SURGERY, 1702
- PANCREAS
  - SURGERY, 1629
  - THERAPY, 1632
- SURGERY
  - PREVENTION, 1752

TREATMENT
- SEE THERAPY
- GASTROINTESTINAL
  - BLEEDING, 1938
- HEPATITIS
  - TRANSFUSION, 1686
- HEPATITIS, VIRAL
  - TRANSFUSION, 1767
- LIVER COMA
  - PLASMAPHERESIS, 1760*, 1764*
  - TRANSFUSION, 1771, 1774
- LIVER DISEASE
  - DIALYSIS, 1716
  - SURGERY, 1717

TRIGLYCERIDE
- BILE
  - HORMONE CONTROL, 1130
- LIVER
  - SECRETION, 1051*, 1130
- METABOLISM
  - DRUG EFFECTS ON, 1122
  - LIVER DISEASE, ALCOHOLIC, 1486*

TRIGLYCERIDES
- LIVER
  - ABSORPTION, 915*
- SMALL INTESTINE
  - ABSORPTION, 915*

TRYPSIN
- PANCREAS
  - SECRETION, 1038
- PANCREAS DISEASE
  - DIAGNOSIS, 1214
- PANCREAS FUNCTION TESTS
  - TECHNIQUES, 1257

TRYPSINOGEN
- PANCREAS
  - SECRETION, 1038

TUBERCULOSIS
- DRUG TREATMENT
  - MALABSORPTION, 1498
- LIVER
  - ANTIBIOTICS, 1741

ULCER
- DISEASES ASSOCIATED WITH
  - GASTRITIS, 1391*
- DUODENUM
  - BLEEDING, 1409
  - BLOOD GROUP, 1409
  - CORTICOSTEROIDS, 1422
  - DIAGNOSIS, 1244
  - DISEASES ASSOCIATED WITH, 1379, 1414, 1424
  - GASTRIN, 1397
  - PEPSINOGEN, 1422
  - SEX FACTORS, 1409
  - SURGERY, 1390*, 1420, 1425
  - VAGOTOMY, 1406
- GASTROINTESTINAL
  - VIRUS INFECTION, 1907
- STOMACH
  - DIAGNOSIS, 1419
  - DISEASES ASSOCIATED WITH, 1414, 1424
  - DRUG TREATMENT, 1415
  - RADIOLOGY, 1419
- STRESS
  - SIMULATION, 1385*

ULCER, DUODENUM
- ACID SECRETION
  - SURGERY, 1398
  - VAGOTOMY, 1393*
- PYLOROPLASTY
  - GASTRIN, 1394*
- STOMACH
  - ACID SECRETION, 1393*, 1430
- VAGOTOMY, 1395*
  - GASTRIN, 1394*
  - SEQUELAE, 1401

ULCER, STOMACH
- STOMACH
  - ACID SECRETION, 1430

ULCERATIVE COLITIS
- SEE ALSO COLITIS
- AGE FACTORS, 1614*
- COLON
  - IMMUNOLOGY, 1617
- DIAGNOSIS
  - IMMUNOLOGY, 1626
- DIET, 1624
- DISEASES ASSOCIATED WITH, 1614*, 1618
  - MUSCULOSKELETAL SYSTEM, 1468*
- EPIDEMIOLOGY, 1623
- IMMUNOSUPPRESSION, 1625
  - CHILDREN, 1620
- REVIEWS, 1541, 1619
- SURGERY, 1622
  - IMMUNOLOGY, 1616*
- ULTRASTRUCTURE, 1621

ULCERS

- GASTROINTESTINAL
  - ASCARIASIS, 1955

- ULTRASTRUCTURE
  - COLON
    - MALACOPLAKIA, 1610
  - CROHNS DISEASE, 1621
  - DUODENUM
    - EMBRYOLOGY, 918*
  - ILEUM
    - CROHNS DISEASE, 1481
  - JEJUNUM
    - GLYCOPROTEINS, 916*
  - LIVER, 915*
    - AMYLOIDOSIS, 1898
    - ANTIHORMONES, 1115
    - CARBON TETRACHLORIDE, 913*
    - CHEMICAL COMPOSITION, 917*
    - CIRRHOSIS, 1820*
    - DRUG EFFECTS ON, 966
    - DRUG METABOLISM, 1146
    - DUBIN-JOHNSON SYNDROME, 1726*
    - ENZYMES, 1068
    - GLUCAGON, 1144
    - HORMONES, 1115
    - IRON, 1063*
    - LIPIDS, 1110
    - LIVER DISEASE, ALCOHOLIC, 1806*, 1813
    - NARCOTICS, 1735
    - PROTEIN, 1135
  - LIVER INJURY
    - CARBON TETRACHLORIDE, 1052*
    - ENZYMES, 1094
  - MEGACOLON, 1516*
  - PANCREAS
    - CARBONIC ANHYDRASE, 911*
  - RECTUM
    - POLYPS, 1594
  - SMALL INTESTINE, 915*
    - DIETARY FACTORS, 914*
    - SEDATIVES, 910*
  - ULCERATIVE COLITIS, 1621

- UREA
  - METABOLISM
    - DIETARY FACTORS, 1176

- UREA SYNTHESIS
  - LIVER
    - DRUG EFFECTS ON, 1067*

- URINE
  - ABSORPTION
    - LARGE INTESTINE, 970
    - SMALL INTESTINE, 970

- UROGENITAL SYSTEM
  - HEPATITIS, VIRAL
    - DISEASE ASSOCIATED WITH, 1788
  - STOMACH
    - DISEASES ASSOCIATED WITH, 931

- VAGOTOMY
  - BILIARY TRACT
    - MOTILITY, 1869
  - BLOOD
    - GASTRIN, 1001*, 1009
  - DUODENUM
    - ULCER, 1406
  - PANCREAS
    - SECRETION, 1395*
  - PEPTIC ULCER
    - ACID SECRETION, 997*
    - BLEEDING, 1373
    - COMPLICATIONS, 1403
    - PERFORATION, 1404
  - PRESSURE STUDIES
    - LIVER, 1924
    - STOMACH, 1924
  - SECRETION
    - HORMONE CONTROL, 1423
  - SEQUELAE, 1400
    - SURGERY, 1365
    - ULCER, DUODENUM, 1401
  - SMALL INTESTINE
    - FLORA, 1384*
  - STOMACH
    - ACID SECRETION, 1009, 1400
    - MOTILITY, 1400, 1406
    - MUCOSA, 1014, 1342*
  - SURVIVAL, 1423
  - ULCER, DUODENUM, 1395*
    - ACID SECRETION, 1393*
    - GASTRIN, 1394*

- VARICES
  - ESOPHAGUS
    - BLEEDING, 1838

- VASOCONSTRICTORS
  - GASTROINTESTINAL
    - BLEEDING, 1884*, 1937
  - LIVER
    - CIRCULATION, 1107

- VIBRATION
  - LIVER
    - MITOSIS, 940

- VIROLOGY
  - HEPATITIS, VIRAL, 1120

- VIRUS INFECTION
  - GASTROINTESTINAL
    - ULCER, 1907

- VITAMIN A
  - LIVER
    - MORPHOLOGY, 1096
  - METABOLISM
    - LIVER, 1096

- VITAMIN B2
  - ABSORPTION
    - BACTERIA, 948*
  - MALABSORPTION
    - BLIND LOOP SYNDROME, 948*

- VITAMIN B12
  - ABSORPTION
    - BACTERIA, 947*
    - SMALL INTESTINE, 959
  - ANEMIA, PERNICIOUS
    - THERAPY, 1163
  - MALABSORPTION
    - ANTIBACTERIALS, 1498
    - BLIND LOOP SYNDROME, 947*

        ETIOLOGY, 1441
        FAMILIAL FACTORS, 1510
    SMALL INTESTINE
        ABSORPTION, 947*, 948*
        BACTERIA, 1154*
    BINDING
        HEPATITIS, VIRAL, 1761*
    MALABSORPTION
        ETIOLOGY, 1154*

VITAMIN E
    LIVER
        LIPIDS, 1142
    MALABSORPTION
        BILIARY ATRESIA, 1260
    SMALL INTESTINE
        ABSORPTION, 943*

VOLVULUS
    APPENDIX, 1560
    INTESTINE, 1545
    LARGE INTESTINE, 1563
    SMALL INTESTINE, 1433
    STOMACH, 1563
        NEONATE, 1370
        RADIOLOGY, 1370
        SURGERY, 1370

VOMITING
    STOMACH
        FOREIGN BODIES, 1360

WATER
    SMALL INTESTINE
        ABSORPTION, 952

WHIPPLES DISEASE
    DIAGNOSIS
        BIOPSY, 1437

WILSONS DISEASE, 1722
    COPPER
        METABOLISM, 1678*

ZINC
    LIVER
        INJURY, 1114

ZOLLINGER-ELLISON SYNDROME
    ACID SECRETION, 1885*
        HORMONE CONTROL, 999*
    BLOOD
        GASTRIC, 1885*
        GASTRIN, 1892
    DIAGNOSIS
        GASTRIN, 1397
    DISEASES ASSOCIATED WITH
        ENDOCRINE SYSTEM, 1346*
    FAMILIAL FACTORS, 1346*
    PANCREAS
        NEOPLASMS, 1639
    SECRETION
        CHEMICAL COMPOSITION, 1883*
    STOMACH
        ENDOCRINE SYSTEM, 1346*
        MUCUS, 1890
        SECRETION, 1890
    SURGERY
        SURVIVAL, 1885*

        THERAPY, 1344*

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PREFACE

GASTROENTEROLOGY ABSTRACTS and CITATIONS is a publication of the National Institute of Arthritis, Metabolism and Digestive Diseases. This specialized information medium has been initiated to fill an existing great need in the field of gastroenterology and to assist the Institute in meeting its obligations to foster and support laboratory and clinical research into the nature, causes, and therapy of diseases of the gastrointestinal tract. Publication GASTROENTEROLOGY ABSTRACTS and CITATIONS makes available citations of all current papers relevant to this field from medical journals published throughout the world. Approximately one-third of the citations dealing with the major aspects of gastroenterology have accompanying abstracts.

The issuing of GASTROENTEROLOGY ABSTRACTS and CITATIONS under the auspices of the National Institute of Arthritis, Metabolism, and Digestive Diseases will provide a much needed current awareness tool to scientists and will facilitate greater integration of research and clinical efforts in this field. The number and great diversity of publications in the area of gastroenterology makes it imperative that an appropriate service be available to investigators and practitioners so that they may be apprised of progress with a minimum of delay. Our aim is to provide the readers with a readily systematized compilation of current published work. The publication will provide the greatest usefulness if these interested investigators will contribute their ideas and comments for consideration whenever possible.

GASTROENTEROLOGY ABSTRACTS and CITATIONS is published monthly and includes citations and abstracts from the biomedical world literature as they are currently received. Volume 7 will appear in, and be dated, 1973. There will be no hiatus in literature coverage from Volume 6 which was dated 1971. In addition, yearly cumulated subject and author indexes are published.

This publication is available free to National Institutes of Health grantees and contractors working in the field of gastroenterology and libraries of medical schools. Requests from these qualified individuals to receive free copies of this publication must include their grant or contract number and the title of their project. These requests as well as address changes and other communications should be addressed to:

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CONTENTS

Abstracts, Citations — Page

PRE-CLINICAL SCIENCES

Morphology, Cellular Structure and Histochemistry . . . 1970-2000 169
Absorption--Excretion--Transport. 2001-2040 173
Motility. 2041-2070 180
Secretion and Metabolism 2071-2073 185
  Stomach. 2074-2107 185
  Pancreas 2108-2123 190
  Hepatobiliary Tract. 2124-2200 193
  Intestine. 2201-2209 200
General 2210-2226 201

DIAGNOSTIC PROCEDURES. 2227-2310 204

GASTROINTESTINAL DISEASES

Esophagus 2311-2343 210
Stomach 2344-2405 212
  Peptic Ulcers. 2406-2503 216
Small Intestine 2504-2570 223
  Regional Enteritis 2571-2579 227
  Malabsorption. 2580-2603 228
Large Intestine 2604-2674 231
  Ulcerative Colitis 2675-2684 237
Pancreas. 2685-2703 238
  Pancreatitis 2704-2728 240
Liver and Biliary Tract 2729-2765 242
  Hyperbilirubinemic States. 2766-2767 245
  Nonviral Hepatitis and Hepatic Injury. 2768-2774 245
  Acute Viral Hepatitis. 2775-2803 246
  Chronic Hepatitis. 2804-2810 250
  Alcoholic Liver Disease. 2811-2820 251
  Cirrhosis. 2821-2844 252
  Gallbladder and Biliary Tract Diseases 2845-2878 255

General 2879-2938 259
  Parasitology 2939-2963 263

AUTHOR INDEX

SUBJECT INDEX

The Secretary of the Department of Health, Education, and Welfare has determined that the publication of this periodical is necessary in the transaction of the public business required by law of this Department. Use of funds for printing this periodical has been approved by the Director of the Office of Management and Budget through April 30, 1975.

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NOTE

Journal names are abbreviated according to the list of abbreviations used by *Index Medicus*. For journals not covered by *Index Medicus*, the abbreviations (with some modifications) found in *World Medical Periodicals*, 3rd Edition, are used.

LANGUAGE ABBREVIATIONS

Afr.	Afrikaans
Ar.	Arabic
Bul.	Bulgarian
Ch.	Chinese
Cz.	Czech
Dan.	Danish
Dut.	Dutch
E.	English
Eston.	Estonian
Fin.	Finnish
Fl.	Flemish
Fr.	French
Ger.	German
Gr.	Greek
Heb.	Hebrew
Hun.	Hungarian
Ic.	Icelandic
In.	Indonesian
It.	Italian
Jap.	Japanese
Kor.	Korean
Latv.	Latvian
Lith.	Lithuanian
Nor.	Norwegian
Pol.	Polish
Por.	Portuguese
Rum.	Rumanian
Rus.	Russian
Ser.	Serbo-Croatian
Sl.	Slovak
Sp.	Spanish
Sw.	Swedish
Th.	Thai
Turk.	Turkish
Uk.	Ukrainian
Viet.	Vietnamese

ABBREVIATIONS USED IN ABSTRACTS

ACTH	adrenocorticotropic hormone
ADP	adenosine diphosphate
AMP	adenosine monophosphate
ATP	adenosine triphosphate
BSP	sulfobromophthalein
C	degrees centigrade
cm	centimeter(s)
CNS	central nervous system
cpm	counts per minute
DNA	deoxyribonucleic acid
e.g.	for example
g	gram(s)
μg	microgram(s)
hr	hour(s)
i.m.	intramuscular
i.p.	intraperitoneal
IU	international unit(s)
i.v.	intravenous
kg	kilogram(s)
LD$_{50}$	median lethal dose(s)
LDH	lactic acid dehydrogenase
m	meter(s)
M	molar
mEq	milliequivalent(s)
mM	millimolar
μM	micromolar
mC,μC	milli-,microcurie(s)
mg	milligram(s)
min	minute(s)
ml	milliliter(s)
mm	millimeter(s)
MTD	maximum tolerated dose
ng	nanogram (10^{-9})
pg	picogram (10^{-12})
p.o.	orally
ppm	parts per million
r	Roentgen
RBC	red blood cells (erythrocytes), red blood count
resp.	respectively
Rev.	review (only in citations)
RNA	ribonucleic acid
s.c.	subcutaneous
sec	second(s)
SGOT	serum glutamic-oxalacetic transaminase
SGPT	serum glutamic-pyruvic transaminase
U	unit(s)
UV	ultraviolet
WBC	white blood cells (leukocytes), white blood count
yr	year(s)

PRE-CLINICAL SCIENCES

MORPHOLOGY, CELLULAR STRUCTURE AND HISTOCHEMISTRY

1970 ISOLATION AND IDENTIFICATION OF A RENIN INHIBITOR FROM OX BILE. *(E.)* Kokubu, T.; Hiwada, K.; Yamamura, Y.; Hayashi, K.; Okumura, J.; Hori, M.; Kobayashi, S.; Ueno, H. (Osaka Univ. Hosp., Fukushima-ku, Osaka, Japan). *Biochem. Pharmacol.* 21(2):209-217, 1972.

Purification of a renin inhibitor in ox bile was carried out by ammonium sulfate fractionation, ialysis, and chromatography on Bio-Gel P-2 and mberlite XAD-2 resin. By means of nuclear agnetic resonance spectroscopy, gas chromatography, nd amino acid and elemental analyses the inhibitor was shown to be taurodeoxycholic acid. urther confirmation was established by direct omparison of its infrared spectrum with that of an authentic sample. Taurodeoxycholic acid nhibited the reaction of rabbit renin with ngiotensinogen *in vitro.* Glycocholic acid, lso present in ox bile, however, had no inhibitory ffect on the renin angiotensinogen reaction.

971 TRYPTAMINE OR TRYPTOPHYL-PEPTIDES IN ENDOCRINE CELLS OF RABBIT GASTRIC ANTRUM. *E.)* Hakanson, R.; Linstrand, K.; Owman, C.; undler, F. (Univ. Lund, Sweden). *Biochem. Pharmacol.* 1(12):1703-1712, 1972.

n sections of stomach specimens from 120 rabbits he pyloric gland area contained argyrophilic pithelial cells, probably of endocrine nature, xhibiting a formaldehyde-induced fluorescence with pectral properties different from those of the luorophores of catecholamines and 5-hydroxytryptamine ut similar to those of the tryptamine and tryptophyleptide fluorophores. Formaldehyde treatment in the resence of ozone markedly improved the fluorescence ield in these cells as compared with formaldehyde lone; combined formaldehyde-HCl caused only moderate mprovement. These features indicate the presence f a tryptophyl-peptide rather than tryptamine in he cells. This is further supported by the failure o demonstrate tryptamine chemically in extracts of astric mucosa.

972 THE PHYSICAL PROPERTIES OF MUCUS: PRELIMINARY OBSERVATIONS ON THE SEDIMENTATION BEHAVIOUR OF PORCINE GASTRIC MUCUS. *(E.)* Johnson, P.; Rainsford, K. D. (Dept. Biochem., Cambridge Univ., England). *Biochim. Biophys. Acta* 286(1):72-78, 1972.

Porcine gastric mucus was prepared with minimum handling, and dilutions, mainly in acetate buffer (pH 3.5), were examined by sedimentation velocity methods. The most rapidly sedimenting component was a typical gel material, comparable in many respects to agar or gelatin, and distinctly different from polymeric materials in true solution. Analysis indicated the widespread occurrence in the gel of weak intermolecular interactions. Change of pH to 7.3, or the addition of structure-disorganizing reagents (8M urea, 6M formamide, 6M guanidine HCl, 10% Triton X-100, and 2% sodium deoxycholate with or without 5% mercaptoethanol) caused considerable lowering of the gel content. Sedimenting behind the gel component were well-defined species in true solution. On diluting, these retained their individuality and had extrapolated sedimentation coefficients of 21.5, 11.5, and 5 S, resp., at pH 3.5. Traces of a more slowly sedimenting fourth component (about 2S) were present both in whole mucus and the supernatant fraction. The pronounced concentration dependence of the most rapid component suggests the intermolecular interaction required by the gel-sedimentation analysis.

1973 AN ENRICHED MICROVILLUS MEMBRANE PREPARATION FROM FROZEN SPECIMENS OF HUMAN SMALL INTESTINE. *(E.)* Welsh, J. D.; Preiser, H.; Woodley, J. F.; Crane, R. K. (Rutgers Med. Sch., New Brunswick, N.J.). *Gastroenterology* 62(4):572-582, 1972.
Thirteen tissue specimens, 7 jejunal and 6 ileal, from 10 patients were studied. The purification technique utilized controlled homogenization of the tissue in ethylenediaminetetraacetate-Tris, initial separation by centrifugation, Tris disruption, and finally fractionation on a discontinuous density gradient. In the gradient, 4-8 bands and a pellet were visible and they were collected in 6 fractions. One fraction, IIIA, is composed largely of microvillar structures, as shown by electron microscopic examination; it accounts for 29% of the enzyme recovered, and contains 3 times the specific activity of the homogenate. This fraction has substantially increased specific activity of sucrase, trehalase, alkaline phosphatase and, when prepared from tissue with normal amounts of lactase, of this enzyme also over the initial homogenate. The peptidases, leucyl naphthylamide hydrolase, and a peptidase which hydrolyzes the β-chain of insulin, were also found in this fraction with increased specific activities. Preliminary studies have indicated that with minor modifications the method can be adapted to similar preparations from per oral biopsies of intestinal mucosa.

1974 QUANTITATIVE ULTRASTRUCTURAL STUDIES ON GASTRIC PARIETAL CELLS. *(E.)* Helander, H. F.; Hirschowitz, B. I. (Dept. Anatomy, Univ. Umea, Sweden). *Gastroenterology* 63(6):951-961, 1972.

Gastric biopsies were taken from 6 healthy dogs in 3 different functional states: before histamine stimulation, during maximal histamine stimulation, and 1 hr after histamine infusion. Morphometric data were obtained from these states by measuring randomly selected parietal cells in electron micrographs. In unstimulated dogs, the area of the secretory surface was about 0.19 m^2/cm^3 of parietal cell mass. In stimulated dogs, this area increased to 1.92 m^2/cm^3. The surface membrane of the cytoplasmic tubulovesicles was reduced from 5.73 to 2.58 m^2/cm^3 as a result of the histamine stimulation. One hr after stopping the histamine infusion, the parietal cells were similar in appearance to those from unstimulated dogs. Secretion virtually ceased in 15-30 min. The data support the theory that during stimulation the tubulovesicular membrane is incorporated into the secretion membrane. The production of acid probably occurs mainly at the secretory surface.

1975 STAINING CHARACTERISTICS OF THE GASTRIN CELL. *(E.)* McGuigan, J. E.; Greider, M. H.; Grawe, L. (J. Hillis Miller Health Ctr., Univ. Florida, Gainesville). *Gastroenterology* 62(5):959-969, 1972.

The antral mucosal gastrin cells from man, hog, rat, and rabbit were identified and characterized by using fluorescein-labeled antibodies to human gastrin. In addition, an assortment of nonimmunological staining techniques were applied to the study of antral gastrin cells from each of these species: these included the application of several staining techniques which had been previously used only in extensive studies of porcine antral gastrin cells. The staining techniques investigated included: Grimelius silver nitrate argyrophilic method, Solicia lead hematoxylin method, Hellerstrom-Hellman silver nitrate argyrophilic method; Bodian silver protein argyrophilic method, Grimelius silver protein method, and Sevier-Munger silver nitrate argyrophilic method. Several of these staining methods had previously been utilized to stain and identify gastrin cells, including those of human antral mucosa. This study indicates that none of the nonimmunofluorescent staining procedures identified the gastrin cell in any of the species, including man. However, an autofluorescent nongastrin cell population(s) was stained by several of these techniques. These results emphasize the care which must be exercised in interpreting the presence of gastrin in cells based on general morphological cell characteristics, distribution, or nonspecific staining reactions. Excluding immunological techniques, positive identification of the gastrin cell by standard light microscopy remains to be accomplished.

1976 EFFECTS OF SALICYLATES ON THE CANINE STOMACH: A MORPHOLOGICAL AND HISTOCHEMICAL STUDY. *(E.)* Lev, R.; Siegel, H. I.; Glass, G. B. J. (New York Med. Coll., New York). *Gastroenterology* 62(5):970-980, 1972.

The acute and chronic effects of aspirin administered p.o. were determined in 3 dogs with total gastric fistulae and in 2 intact dogs. The dosages used ranged from 108-117 mg/kg/day for 3 weeks followed by 260-310 mg/kg/day for 1 week. Two dogs received 130 and 101 mg/kg/day for 10 and 4 days, resp. Serial gastroscopic examinations were carried out in the fistula-bearing dogs, permitting visual inspection and procurement of biopsy specimens. Autopsy specimens were available in 4 dogs. Histochemical techniques and *in vivo* radioautography using $Na_2{}^{35}SO_4$ for sulfated mucin incorporation were employed. Four hr after the initial dose of aspirin, endoscopic examination revealed many 2-4 mm fundic erosions in all 3 fistula-bearing dogs, and hemorrhagic or pink gastric secretions in 2 dogs; antral erosions were found in 1 dog. Aspirin induced systemic signs of toxicity in all animals with 3 fatalities. One dog died of hematemesis due to bleeding jejunal erosions, and 1 died from a perforated gastric ulcer. Gross lesions included hemorrhagic mucosal erosions and, with larger doses, larger erosions and generally shallow ulcers. The most common histopathological changes were degeneration or necrosis of surface epithelium and mucosal hemorrhages. The fresh ulcers and larger erosions exhibited signs of acute inflammation; older lesions showed early stromal and epithelial repair. In grossly normal areas, a cuboidal regenerative-type surface epithelium and numerous mitoses in the crypts were frequently found, suggesting a chronic response to sustained, aspirin-induced damage. Intracellular mucin was reduced in both damaged and regenerating epithelium.

1977 AUTORADIOGRAPHIC LOCALIZATION OF I-125 LABELED ALBUMIN IN THE INTESTINE OF GUINEA PIGS: A LIGHT AND ELECTRON MICROSCOPIC STUDY. *(E.)* Brooks, S. G.; Dobbins, III., W. O. (George Washington Univ. Med. Ctr., Washington, D.C.). *Gastroenterology* 62(5):1001-1012, 1972.

This study demonstrates the distribution of i.v. injected ^{125}I-labeled guinea pig albumin in the small intestine by combined light and electron microscopic autoradiography. Biopsies of guinea pig small intestine were obtained at intervals ranging from 1 min-2 hr after injection of labeled albumin. Control studies demonstrated the physiologically pure nature of the labeled albumin and showed absence of specific localization when ^{125}I-labeled NaI was injected alone. Peak localization of grains was within the vascular system after only 1 min. By 15 min, peaks of concentration were noted within central lacteals, in epithelial extracellular spaces adjacent to the vascular system, and in all other extracellular spaces. These areas retained a high concentration of grains for the 2 hr of the experiments. Cellular components demonstrating significant localization of activity were the vascular and lymphatic endothelia, primarily the vascular, which showed an almost constant concentration. Minimal localization of grains was shown over intestinal absorptive cells and cells of the lamina propria. Albumin exhibited a noncellular distribution. The nearly uniform grain count over the vascular endothelium indiated constant passage of albumin across the ndothelium. The presence of albumin in the xtracellular spaces of the epithelium and n absorptive cells suggests that these com- artments may represent the route of loss f albumin through the gastrointestinal tract n normal states.

78 A QUANTITATIVE MORPHOLOGICAL ANALYSIS OF ETHANOL EFFECT UPON RAT LIVER.

E.) Dobbins, III, W. O.; Rollins, E. L.; rooks, S. G.; Fallon, H. J. (George Washington niv. Med. Ctr., Washington, D.C.). *Gastroenterology* 2(5):1020-1033, 1972.

ale Sprague-Dawley rats (24) were divided into 3 air-fed groups: chow and 25% ethanol in drinking ater; chow and an amount of sucrose isocaloric the ethanol; and 25% ethanol in water and chow pplemented with 2% choline. After 35 days, a ortion of liver was prepared for electron micro- copy by standard techniques. Liver was analyzed or total phospholipid, triglyceride, lecithin, itroreductase activity, and aniline hydroxylase ctivity. From each specimen 25 electron micro- raphs were obtained randomly. Micrographs were nalyzed by the linear analysis method for cell nd nuclear dimensions, and fractional volume f cytoplasmic components including mitochondria, eroxisomes, lysosomes, lipid bodies, and glycogen. urface area of the mitochondrial envelope and he endoplasmic reticulum membrane and the approxi- ate volume of mitochondria and peroxisomes were etermined. Subjective analysis of electron micro- raphs failed to distinguish clearly the controls rom the ethanol-treated rats. However, linear alysis with statistical evaluation showed creased hepatic cell size and total volume of tochondria, peroxisomes, lysosomes, and lipid odies in the rats fed 25% ethanol. All of these anges were partially reversed by 2% choline pplementation. The surface area of both smooth d rough endoplasmic reticulum membrane was duced 50% in the ethanol-treated animals. This ange was partially reversed by choline. Ethanol- duced increases in total liver phospholipid d lecithin were largely reversed by choline. iline hydroxylase increased 2-fold in the hanol-treated rats when compared with control ts and 3-fold in the rats fed ethanol plus oline. No change occurred in microsomal troreductase activity in rats given ethanol.

the end of the experiment the mean serum level of hanol was 153 mg/100 ml, ranging from 33-270 mg/ 0 ml.

79 ALBUMIN SYNTHESIS BY HUMAN LIVER CELLS: ITS MORPHOLOGICAL DEMONSTRATION. *(E.)*

ldmann, G.; Penaud-Laurencin, J.; Crassous, J.; nhamou, J. P. (Beaujon Hosp., Clichy, France). *stroenterology* 63(6):1036-1048, 1972.

ascertain the nature and number of the cells ich synthesize albumin in the normal human liver, surgical liver biopsy specimens from 15 subjects (10 men, 5 women; 20-60 yr old) with no liver disease were prepared. The subjects were operated on for chronic peptic ulcer or uncomplicated cholelithiasis. Albumin was demonstrated by an immunocytochemical technique using antibodies labeled with horseradish peroxidase. Sections were studied by light and electron microscopy. In light microscopy, the reaction product of peroxidase, indicating the presence of albumin, was seen in 35.9 ± 13.5% of hepatocytes, but not in Kupffer cells or in cells of the bile duct epithelium. In electron microscopy, albumin was demonstrated on the ribosomes and membranes of the rough endoplasmic reticulum, a location which suggests that hepatocytes which contain albumin have also synthesized it but not in the lumina of the rough endoplasmic reticulum. When the same studies were performed on needle biopsy specimens of liver from 3 patients with the nephrotic syndrome, a condition in which there is good reason to believe that albumin synthesis is increased, the percentages of hepatocytes reacting for albumin were of the same order as in the normal livers (32.5, 36.4, and 17.5%, resp.) but the reaction was more intense One of these 3 patients had hepatomegaly. Under conditions of augmented albumin synthesis it appears that the increase is due to enhanced production of albumin on the part of albumin-synthesizing cells, not by a rise in the number of such cells. In the livers from nephrotic subjects, albumin was detected in the lumina of the rough endoplasmic reticulum in addition to the ribosomes and membranes; this could be attributed to increased albumin production.

1980 FINE STRUCTURAL LOCALIZATION OF ACYLTRANSFERASE ACTIVITY IN RAT HEPATOCYTES. *(E.)*

Benes, F. M.; Higgins, J. A.; Barrnett, R. J. (Yale Sch. Med., New Haven, Conn.). *J. Histochem. Cytochem.* 20(12):1031-1040, 1972.

Liver slices from adult male albino rats were used to formulate a method for the fine structural localization of acyltransferases catalyzing the transfer of acyl groups from palmityl-coenzyme A (CoA) to α-glycerophosphate. It is based on the formation of a heavy metal precipitate at the site of CoA release. CoA released through enzyme action is oxidized by potassium ferricyanide, which is reduced to potassium ferrocyanide and precipitates in the presence of cupric ions. Acyltransferase activity survived both fixation in 1% glutaraldehyde and incubation in the presence of the capture reagent system used for cytochemistry. Reaction product marking the enzyme activity was located within the cisternae of the rough endoplasmic reticulum and to lesser, but significant extent, within the membranous envelope of the smooth endoplasmic reticulum. Reaction product was not associated to any significant extent with other membranous organelles. These observations reveal some of the role of acytransferases in liver function but do not allow determination of the site of acyltransferase activity.

1981 CHANGES IN THE SMALL INTESTINE EPITHELIUM DURING EXPERIMENTAL INHIBITION OF CHOLESTEROL BIOSYNTHESIS BY TRIPARANOL. LIGHT AND ELECTRON MICROSCOPE FINDINGS. *(Ger.)* Otto, H. F. (Pathol. Inst., Univ. Hamburg, Germany). *Zentralbl. Allg. Pathol.* 115(3):588-599, 1972.

Triparanol (50 mg/kg/day in corn oil p.o. through a stomach tube) was administered to young female Wistar rats for 21, 29, and 53 days. After a 5 hr fast, animals were sacrificed 24 hr and 3-4 weeks after the last dose of triparanol, and light and electron microscope examinations were made of the gastric antrum, postpyloric duodenum, small intestine 30 cm below the pylorus and 6 cm above the ileocecal valve, and colon 10 cm below the ileocecal valve. Although no villous atrophy developed during the observation period in any of the specimens examined, an increase occurred in the number of atonic villi, primarily in the duodenum, after 53 doses of triparanol. This was associated with a rarefaction of smooth musculature in the villi. The activities of membrane, mitochondrial, and microsomal enzymes decreased significantly, while the activity of lysosomal acid phosphatase increased. For the most part, these enzyme activities had returned to normal 3-4 weeks after discontinuation of triparanol. In addition to destructive mitochondrial changes (swelling and membrane disruption and vesicular changes in the endoplasmic reticulum, electron microscopy demonstrated an increase in cytoplasmic inclusion bodies (residual bodies) and diffuse hyperplasia and increases in the number of Golgi complexes. The membrane changes are considered to result from intracellular cholesterol deficiency.

1982 THE TYPE AND CONTENT OF THE SIALIC ACID OF BILE FROM SEVERAL ANIMAL SOURCES. *(E.)* Cabezas, J. A.; Ramos, M. (Fac. Sci., Univ. Salamanca, Spain). *Carbohyd. Res.* 24(2):486-488, 1972.

1983 QUANTITATION OF THE NUMBER OF VILLI AND CRYPTS IN THE INTESTINE OF RODENT ANIMALS. *(E.)* Fujii, R. (Aichi Cancer Ctr. Res. Inst., Chikusa-ku, Nagoya, Japan). *Experientia* 28(10):1209-1210, 1972.

1984 THE 1-O-GALACTOSYLCERAMIDE FATTY ACID ESTERS FROM HOG STOMACH. *(E.)* Slomiany, B. L.; Slomiany, A.; Horowitz, M. I. (New York Med. Coll., N.Y.). *Biochim. Biophys. Acta* 280(3):383-392, 1972.

1985 PROTEIN MALNUTRITION AND GASTRO-INTESTINAL HISTAMINE IN THE RAT. *(E.)* Ndika, L. I. L. (Coll. Med., Univ. Lagos, Nigeria). *Br. J. Nutr.* 28:153-165, 1972.

1986 ISOLATION AND IDENTIFICATION OF PHARMACOLOGICALLY ACTIVE AMINO ACIDS IN SKIN AND THEIR STRUCTURE-ACTIVITY RELATIONSHIP ON THE GUINEA-PIG ILEUM. *(E.)* Lewis, G. P.; McMartin, C.; Rosenthal, S. R.; Yates, C. (CIBA Labs, Horsham, Sussex, England). *Br. J. Pharmacol.* 45(1):104-117, 1972.

1987 PRECAPILLARY ANASTOMOSES IN THE HUMAN LIVER. *(E.)* Sinzinger, H. F.; Feigl, W. (Fac. Med., Univ. Vienna, Austria). *Okajimas Folia Anat. Jap.* 49(1):1-12, 1972.

1988 FEEDBACK CONTROL BY FUNCTIONAL VILLUS CELLS ON CELL PROLIFERATION AND MATURATION IN INTESTINAL EPITHELIUM. *(E.)* Galjaard, H.; van der Meer-Fieggen, W.; Giesen, J. (Rotterdam Med. Fac., Netherlands). *Exp. Cell Res.* 73(1):197-207, 1972.

1989 THE ATTACHMENT OF CLOSTRIDIUM WELCHII (CL. PERFRINGENS) TYPE C TO INTESTINAL VILLI OF PIGS. *(E.)* Arbuckle, J. B. R. (Roy. Vet. Coll., Potters Bar, England). *J. Pathol.* 106(2):65-72, 1972.

1990 GROWTH AND DEVELOPMENT OF "ANTIGEN-FREE" GRAFTS OF FOETAL MOUSE INTESTINE. *(E.)* Ferguson, A.; Parrott, D. M. V. (Western Infirm., Univ. Glasgow, Scotland). *J. Pathol.* 106(2):95-101, 1972.

1991 PSEUDOANGIOTENSIN II IN GASTRIC JUICE. *(E.)* Sahadevan, V.; Fraser, R. (Roy. Postgrad. Med. Sch., London, England). *Horm. Metab. Res.* 4(3):210-212, 1972.

1992 A METHOD FOR THE ISOLATION AND PURIFICATION OF NORMAL RAT LIVER AND HEPATOMA NUCLEAR "GHOSTS" BY ZONAL CENTRIFUGATION. *(E.)* Price, M. R.; Harris, J. R.; Baldwin, R. W. (Univ. Nottingham, England). *J. Ultrastruct. Res.* 40(1/2):178-196, 1972.

1993 VISUALIZATION OF THE GOLGI APPARATUS IN LIVER AND PANCREATIC CELLS BY USING OSMIUM STAINING WITH THE ELECTRON MICROSCOPE. *(It.)* Inferrera, C.; Carrozza, G.; Barresi, G. (Inst. Anat. Pathol. Histol., Univ. Messina, Italy). *Boll. Soc. Ital. Biol. Sper.* 48(8):207-208, 1972.

1994 SITES OF OSMORECEPTORS IN THE LIVER. *(Rus.)* Finkinshtein, Ia. D.; Kogan, A. S.; Terner, A. Ia.; Aizman, R. I. (Novosibirsk Med. Inst., USSR). *Fiziol. Zh. SSSR* 58(5):722-728, 1972.

1995 UNUSUAL PROLIFERATION OF BILE-DUCT CELLS IN ICR FEMALE MICE GIVEN 2,7-FLUORENYLBIS-ACETAMIDE WHILE NURSING SUCKLINGS. *(E.)* Kimura, I.; Sakuma, F.; Ito, Y.; Nishio, O.; Yasukawa, S. (Aichi Cancer Ctr. Res. Inst., Chikusa-ku, Nagoya, Japan). *Gann* 63(4):507-508, 1972.

1996 THE NATURE OF THE PARASYMPATHETIC NERVE FIBRES OF THE STOMACH OF RANA TEMPORARIA. *(E.)* Rashid, S. (King's Coll., London, England). *Arch. Int. Pharmacodyn. Ther.* 195(2):247-251, 1972.

1997 HISTOPATHOLOGICAL CHANGES IN THE RAT GASTROINTESTINAL TRACT AFTER PROLONGED ADMINISTRATION OF AMPHETAMINE. *(Pol.)* Niepolomski, W.; Luciak, M.; Pasiewicz, J.; Trzeciak, H. (Silesian Acad. Med., Katowice, Poland). *Patol. Pol.* 23(3): 401-408, 1972.

1998 STUDIES ON THE LYMPHOCYTES IN THE INTESTINAL EPITHELIUM ON THE CHICKEN. I. ONTOGENY. *(E.)* Back, O.; (Inst. Human Anat., Univ. Uppsala, Sweden). *Acta Pathol. Microbiol. Scand.* [*A*] 80(1);84-90, 1972.

1999 STUDIES ON THE LYMPHOCYTES IN THE INTESTINAL EPITHELIUM OF THE CHICKEN. 2. KINETICS. *(E.)* Back. O.; (Inst. Human Anat., Univ. Uppsala, Sweden). *Acta Pathol. Microbiol. Scand.* [*A*] 80(1):91-96, 1972.

2000 SOME OBSERVATIONS ON THE ULTRASTRUCTURE OF DIFFERENTIATION OF THE ESOPHAGEAL EPITHELIUM IN MAMMALS. *(E.)* Sevcenko, G.; Brichova, H.; Vacek, Z. (Inst. Embryol., Fac. Med., Charles Univ., Prague, Czechoslovakia). *Folia Morphol.* 20(1):79-81, 1972.

See also 2018, 2116, 2119, 2121, 2142, 2153, 2187, 2204, 2205, 2223, 2505, 2882.

ABSORPTION—EXCRETION—TRANSPORT

2001 EFFECT OF INTRAVENOUS SALICYLATES ON THE GASTRIC MUCOSAL BARRIER IN MAN. *(E.)* Ivey, K. M.; Morrison, S.; Gray, C. (Roy. Prince Alfred Hosp., Camperdown, Australia). *Am. J. Dig. Dis.* 17(12):1055-1064, 1972.

In patients with rheumatoid arthritis and in addicts taking large doses of aspirin a high incidence of gastric ulceration was found. In rheumatoid arthritis a serum salicylate level of 15 mg/100 ml is considered therapeutic. Gastric mucosal permeability to ions was studied in 9 healthy subjects (5 male, 4 female, aged 19-26 yr) given 3 g aspirin i.v. over 2 hr (mean serum salicylate, 17 mg/100ml). Atropine was injected i.v. to reduce acid secretion which masks H^+ loss. During aspirin infusion H^+ and Na^+ fluxes were not significantly different from those during i.v. saline infusion. Thus, high blood levels of salicylates did not impair the gastric mucosal barrier. Intragastric salicylic acid following i.v. aspirin infusion increased gastric mucosal permeability to H^+ and Na^+ ions. Under the conditions of these studies, the effect was more marked in males. Gastric absorption of salicylic acid was similar in males and females, and the amount absorbed was unaffected by high blood salicylates levels. Absorption of salicylic acid was significantly greater in the first period of salicylic acid instillation (mean, 28%) than in the second (mean, 21%) and third (mean, 16%) periods. Percentage absorption of undissociated salicylic acid was 3-7 times greater than that of H^+ ions.

2002 STUDIES ON IRON ABSORPTION I. THE ROLE OF LOW MOLECULAR POLYMER IN IRON ABSORPTION. *(E.)* Terato, K.; Fujita, T.; Yoshino, Y. (Nippon Med. Sch., Bunkyo-ku, Tokyo, Japan). *Am. J. Dig. Dis.* 18(2):121-128, 1973.

The mechanism of iron absorption by the intestine was studied *in vitro* and *in vivo* using various iron chelates and polymers with molecular weights below 100,000. *In vitro* experiments using mouse intestine revealed that iron chelates and polymers with molecular weights below 10,000 were transported similarly from mucosal to serosal medium, but iron polymer with a molecular weight of 100,000 was not transported. The amount of iron transported from mucosa to serosa was proportional to the iron concentration in the mucosal medium, and the iron concentration in serosal and mucosal medium was equilibrated with a concentration gradient which paralleled the reciprocal of the molecular weight of iron complexes. This suggests the possibility of a saturation phenomenon of iron transport in intestinal cells. Furthermore, *in vivo* studies using ligated rat intestine confirmed that iron is transferred from mucosa into the blood not only in ionic or chelate forms but also as low molecular weight iron polymers which are unaffected in intestinal cells. Iron valence was not an important factor in intestinal iron transport.

2003 STUDIES ON IRON ABSORPTION. II. TRANSPORT MECHANISM OF LOW MOLECULAR IRON

CHELATE IN RAT INTESTINE. *(E.)* Terato, K.; Hiramatsu, Y.; Yoshino, Y. (Nippon Med. Sch., Bunkyo-ku, Tokyo, Japan). *Am. J. Dig. Dis.* 18(2):129-134, 1973.

Ligated intestinal loops of male albino rats were used to study the mechanism of iron absorption. Low molecular iron chelate, stable at neutral pH, was used to prevent factors such as the physicochemical properties of iron salts from influencing intestinal absorption of iron. Mucosal uptake of ^{59}Fe ceased within 1 hr of the iron injection into jejunum, while net transport of iron from lumen to carcass was proportional to time. Total iron absorption by duodenum, jejunum, ileum, and rectum was 8.2, 6.0, 5.0, and 5.1%/cm, resp., while net transport of iron to carcass was 6.0, 1.2, 0.7, and 2.3%/cm of intestinal length in 2 hr. Net transport of iron to the carcass via the duodenum was higher than via other intestinal segments. The mucosal uptake and net transport of iron from lumen to carcass increased proportionally, depending on the amount of iron injected into duodenum and jejunum in the range of 20-1000 μg. Cycloheximide significantly inhibited the mucosal uptake of iron, but had no effect on the net transport of iron from lumen to carcass via the duodenum and jejunum. This inhibitory effect suggests that the acceleration of iron-binding associated with protein synthesis occurs during iron absorption.

2004 NA AND Cl TRANSPORT ACROSS ISOLATED PROXIMAL SMALL INTESTINE OF THE RABBIT. *(E.)* Fromm, D. (Dept. Surgery, Univ. California, San Francisco). *Am. J. Physiol.* 224(1):110-116, 1973.

Fluxes of ^{24}Na, ^{22}Na, and ^{36}Cl were measured across short-circuited rabbit small intestine just distal to the ligament of Treitz and stripped of its serosa and muscularis. Negligible net transport of Cl and spontaneous net secretion of Na were observed. A residual ion flux (J^{R}_{net}) consistent with anion movement from serosa to mucosa or cation movement from mucosa to serosa was also observed. Exposure of the mucosa to D-glucose (5-35 mM) or 3-O-methylglucose (30 mM) abolished Na secretion by increasing the unidirectional mucosa-to-serosa flux (Jms) and did not measurably affect the unidirectional serosa-to-mucosa flux (Jsm). In contrast to prior results in ileum, theophylline (10 mM) on proximal intestine did not produce a net secretion of Cl, did not increase J^{Cl}_{sm}, and did not significantly alter J^{Na}_{net}. In agreement with prior results for ileum, theophylline did decrease conductance, did decrease J_{ms} of both Na and Cl, and did not significantly alter J^{R}_{net}.

2005 SOME FINDINGS ON THE MECHANISM OF ADAPTATION OF THE INTESTINE TO CALCIUM DEFICIENCY. *(E.)* Winter, M.; Morava, E.; Horvath, T.; Simon, G.; Sos, J. (Semmelweis Univ. Med. Sch., Budapest, Hungary). *Br. J. Nutr.* 28(1):105-111, 1972.

The absorption rate of Ca was measured *in vivo* by an isotope technique in male rats given either a normal or a low-Ca diet (casein 20%, wheat meal 23%, starch 45%, sunflower-seed oil 7%, salt mixture + vitamin mixture 5%). The Ca content of normal diet was 0.6% and of low-Ca diet, 0.1%. Increasing the amount of Ca injected into the lumen of the intestine decreased the rate of Ca absorption. When the dose was greater than 100-150 μg Ca, the extent of absorption was a linear function of the Ca concentration in both duodenum and jejunum. In rats given a Ca-deficient diet for 2 weeks the absorptive capacity of both the duodenum and jejunum was significantly enhanced. A quantitative difference was observed between duodenal and jejunal Ca absorption. Since Ca deficiency influenced only the response at low-dose levels, a low-Ca diet apparently increases the capacity of some saturable transport mechanism, but the rate of passive Ca diffusion through the intestine remains unchanged. Parathyroidectomy, before adaptation to Ca deficiency, prevented the increase in Ca absorption in Ca-deficient rats, but diminished it only slightly in rats given a normal diet. Parathyroidectomy performed after adaptation to Ca deficiency also decreased Ca transport across the intestine, which suggests that the parathyroids are necessary for increasing the capacity of the rat intestine to absorb Ca.

2006 THE GASTROINTESTINAL ABSORPTION OF ATROPINE IN MAN. *(E.)* Beermann, B.; Hellstrom, K.; Rosen, A. (Karolinska Inst., Serafim Hosp., Stockholm, Sweden). *Clin. Sci.* 40(1):95-106, 1971.

An aqueous solution of ^{3}H-atropine (2 mg, 50 μCi) and polyethylene glycol (PEG, unabsorbable marker), was administered p.o. by intrajejunal infusion (100 cm from the nose) to 10 healthy males aged 46-62 yr old. The uptake of p.o. administered ^{3}H-atropine occurred mainly in the duodenum and jejunum; none was absorbed in the stomach. However, to a small extent such a change was noted *in vitro* on incubation of ^{3}H-atropine with concentrated duodenal bile. The ratio between radioactivity mg PEG of intestinal aspirates and that of the test solution demonstrated that 90% of the given label is absorbed in the proximal part of the small intestine. The maximum amount of label recovered in 3000 ml plasma corresponded to 3% of the given dose. The cumulative excretion of label in urine and feces during 6 days amounted to 65% and 5%, resp. A 50% yield of radioactivity in urine and feces during 6 days after an i.v. injection of 1 mg (20 μCi) ^{3}H-atropine to one subject amounted to 66% and 1.5% resp. Electrophoretic and chromatographic analyses of small intestinal aspirates showed no consistent evidence of a metabolic change in the drug.

2007 INTESTINAL ABSORPTION OF GLUCOSAMINE AND N-ACETYLGLUCOSAMINE. *(E.)* Tesoriere, G.; Dones, F.; Magistro, D.; Castagnetta, L. (Inst Chem.

3iol., Univ. Palermo, Italy). *Experientia* 28(7):
770-771, 1972.

Sacs of everted small intestine and transversely cut
segments from male Wistar rats were used to study
intestinal absorption of glucosamine and N-acetyl-
glucosamine. In all 12 experimental runs the data
indicated that glucose transport into intestinal
cells is carrier mediated and independent of Na^+.
The influx of N-acetylglucosamine appeared to be a
simple process of diffusion. Both compounds were
ıbsorbed without changes in their molecular structure;
-acetylglucosamine was not deacetylated.

008 EFFECT OF SODIUM DEOXYCHOLATE ON NET
TRANSINTESTINAL MOVEMENT IN THE URAEMIC
RAT: ACUTE EXPERIMENTS. *(E.)* Drueke, T.;
Ganeval, D.; Marche, C. (Necker Hosp., Paris,
'rance). *Experientia* 28(11):1334-1335, 1972.

he effects of unconjugated sodium deoxycholate
NaDc) on net solute blood-to-lumen transfer in
inephrectomized male WC albino rats were studied
using single loop *in situ* preparations of the proxi-
al small intestine. The loops were excised 10
5, or 30 min after injection of a prewarmed
annitol-NaCl solution with or without 2 mM NaDc
njection. An increase occurred in net blood-
umen transfer of creatinine after 15 and 30
in and of phosphorus after 10, 15, and 30 min
ith 2mM NaDc in the lumen. Sodium and potassium
lood-lumen transfers were also significantly
ncreased after 15 min. Net sodium, potassium,
alcium, and water fluxes did not differ signi-
icantly from controls at 10 and 30 min. Increased
embrane permeability to nitrogenous substances
nd electrolytes could be of interest in clinical
anagement of chronic uremia.

009 A DISCREPANCY BETWEEN THE ACCUMULATION OF
L-PHENYLALANINE IN THE INTESTINAL WALL
ND THE APPEARANCE RATE IN THE BLOOD. *(E.)* Winne,
. (Pharmacol. Inst., Univ. Tubingen, Germany).
ed. Eur. Biol. Soc. Letters 27(1):94-96, 1972.

ejunal loops of rats were perfused with an
sotonic buffered solution containing 31.1 μM
-[U-^{14}C] phenylalanine and 33.3 mM unlabelled
-phenylalanine. The blood did not recirculate.
he concentration of L-phenylalanine was measured
n the intestinal wall 25 or 70 min after initiation
f perfusion. The appearance rate of L-phenylalanine
n the intestinal venous blood increased propor-
ionally to the luminal concentration up to 33.3 mM
hile the accumulation of L-phenylalanine in the
ntestinal wall already showed saturation kinetics.
ince the *in vivo* appearance rate does not parallel
he accumulation rate, it is suggested that accumu-
ation of L-phenylalanine is only a by-pass during
ransfer of this substance from the intestinal
umen to the blood.

)10 INTESTINAL CALCIUM TRANSPORT: COMPARISON
OF DUODENUM AND ILEUM IN VIVO IN THE RAT.
(E.) Younoszai, M. K.; Schedl, H. P. (Univ. Iowa Coll. Med., Iowa City). *Gastroenterology* 62(4): 565-571, 1972.

Male albino rats were loaded i.m. with 25 μCi of ^{45}Ca/100 g, and the lumen of the duodenum and ileum were perfused with either a calcium-free solution (NaCl) or a solution containing 3.4 mM calcium (NaCl + Ca). Net movements of ^{45}Ca and ^{40}Ca and their intestinal tissue and plasma concentrations were measured. In the NaCl study the net ileal calcium secretion was 2-3 times that in the duodenum. In the NaCl + Ca studies ^{40}Ca was absorbed, ^{45}Ca was secreted, and the 4 fluxes across the mucosa could be calculated. The ileal mucosa-to-lumen flux was 1.5 times that in the duodenum. Lumen-to-mucosa fluxes were several times greater than mucosa-to-lumen fluxes. The duodenal lumen-to-mucosa flux was 1.7 times that in the ileum. Fluxes at the base of the cell were much greater than those at the brush border in both intestinal segments. The greater absorptive activity of the duodenum as compared with the ileum may be related to the difference in fluxes at the base of the cell, and it is suggested that this may be the rate-limiting step in serosal calcium absorption.

2011 EFFECT OF PHENOBARBITAL ON THE ABSORPTION OF INORGANIC AND HEMOGLOBIN IRON IN THE RAT. *(E.)* Thomas, F. B.; McCullough, F. S.; Greenberger, N. J. (Ohio State Univ. Hosp., Columbus). *Gastroenterology* 62(4):590-599, 1972.

Studies were carried out in female Sprague-Dawley rats to determine the effect of phenobarbital on the absorption of inorganic and hemoglobin iron labeled with ^{59}Fe. The rats were given sodium phenobarbital dissolved in 0.9% saline (80 mg/kg i.p. for 5 consecutive days). The *in vivo* absorption of $^{59}FeSO_4$ was significantly increased in phenobarbital-treated rats compared to controls (20.4 ± 5.7 versus 9.8 ± 4.2%). Phenobarbital treatment also resulted in partial reversal of the defect in ferrous iron absorption induced by prior iron loading (6.8 ± 1.9 versus 3.4 ± 1.0%) or by cycloheximide (4.9 ± 1.5 versus 2.2 ± 0.3%). Phenobarbital treatment *in vitro* resulted in a significant increase in mucosal transfer of $^{59}FeSO_4$ by everted duodenal gut sacs compared to controls (51.3 ± 8.8 versus 28.0 ±5.9 mμmol), but did not affect transport of $^{59}FeSO_4$ by jejunal gut sacs. It is postulated that phenobarbital-mediated increase in absorption of inorganic iron is related to increased synthesis of a carrier substance that influences iron transport. It is suggested that the increased absorption of hemoglobin iron resulting from phenobarbital treatment is due, at least in part, to increased mucosal heme-splitting enzyme activity.

2012 DIFFERENCES IN THE INTESTINAL ABSORPTION OF SATURATED AND UNSATURATED LONG CHAIN FATTY ACIDS. *(E.)* Ockner, R. K.; Pittman, J. P.; Yager, J. L. (San Francisco Med. Ctr., California). *Gastroenterology* 62(5):981-992, 1972.

Intestinal absorption of long-chain fatty acids was studied in male albino Sprague-Dawley rats using intraduodenal infusion ot mixed micelles or emulsions containing ^{14}C-fatty acid, monoolein, and taurocholate. Mixed micelles were prepared in 20 mM taurocholate and contained the following lipid concentrations: (1) 19.2 mM palmitic or linoleic acid, 9.6 mM monoolein; (2) 28.8 mM fatty acid, 14.4 mM monoolein. Saturated palmitic acid consistently required a greater length of intestine for its absorption than did the unsaturated linoleic acid. In short term experiments, even when uptake of the two fatty acids by mucosa was similar, palmitate esterification was significantly less rapid. *In vitro* studies with everted sacs incubated in mixed micelles confirmed that although uptake of palmitate equaled or exceeded that of linoleate, palmitate esterification was significantly less rapid and, in contrast to linoleate esterification, was further reduced by high palmitate and low taurocholate concentrations. The initial uptake of both fatty acids conformed to saturation kinetics, with similar V_{max} and slightly differing K_m's. It is concluded that although intraluminal solubility of palmitate is less than that of linoleate, initial uptake of the 2 lipids by intestinal mucosa is similar. However, significant differences in rates of entry into the cell and/or rate of microsomal metabolism result, for the saturated fatty acid, in a significantly less rapid reesterification and, therefore, overall absorption. These findings may account for the previously observed differences in intestinal lipoprotein formation and for the greater absorption of unsaturated fatty acids reported in patients with steatorrhea.

2013 EFFECT OF CHOLERA TOXIN ON FLUID ABSORPTION AND VILLUS LYMPH PRESSURE IN DOG JEJUNAL MUCOSA.

(E.) Lee, J. S.; Silverberg, J. W. (Univ. Minnesota Med. Sch., Minneapolis). *Gastroenterology* 62(5):993-1000, 1972.

Dog jejunal mucosa exposed to purified cholera toxin secreted fluid *in vivo*. When it was studied *in vitro*, net fluid transport was from mucosa to serosa, or absorption. The fluid absorption rate was, however, markedly reduced. The villus lymph pressure was also decreased in toxin-exposed villi to about 54% of that of control villi. These findings indicate that the net fluid absorptive activity by the villus is reduced by the action of cholera toxin. Within a wide range of dose of cholera toxin (30-400 μg/cm) or exposure time *in vivo* (1-7 hr), the fluid absorption rate *in vitro* was decreased to the same extent (50-53% of the control value). On the other hand, the fluid secretion rate *in vivo* increased with increasing dose of toxin or exposure time. These findings suggest that cholera toxin reduces the absorptive function of the villus epithelium, but other functional areas, such as the crypts or microcirculatory disturbances, or both are in involved in excessive production of fluid. The composition of the absorbate with respect to glucose, Na, and Cl was the same in control and toxin-exposed mucosa, suggesting that a simultaneous toxin-induced secretion with a different composition might not occur *in vitro*. It is concluded that both a reduction of fluid absorption and an increase of fluid secretion from intestinal mucosa may be involved in net fluid production in cholera.

2014 SPECIFICITY OF THE VITAMIN B_{12} TRANSPORT SYSTEM IN THE SMALL INTESTINE OF THE NEONATAL RAT.

(E.) Gallagher, N. D.; Foley, K.; Brown, J. (Dept. Med., Univ. Sydney, Australia). *Gastroenterology* 63(1):83-87, 1972.

The amount of vitamin B_{12} transported across the gut of 8-10 day-old rats was measured 5 hr after they had been fed 0.5 ml of a solution containing 100 ng of ^{57}Co-labeled vitamin B_{12}. The experiments were then repeated after the inclusion of 1 μg of a vitamin B_{12} analogue in the test dose. Vitamin B_{12} analogues included substituted cobalamins, propionamides, and nucleotides. The following 13 analogues were tested, the last 8 of which interferred with vitamin B_{12} transport: anilide, ethylamide monocarboxylic acid, monobasic acid, dibasic acid, pseudo-B_{12}, methylamide, ethylamide, hydroxocobalamin, sulfitocobalamin, methylcobalamin, ammonia cobalichrome, B_{12} carbanilide, 5-methylbenziminazole, and cyanocobamide. The information which was obtained from these studies about the binding regions of the vitamin B_{12} molecule was compared with that obtained from *in vitro* studies of vitamin B_{12} binding in gastric juice and whey. Binding of the vitamin to the intestinal transport protein involved 2 of the propionamide side chains of the corrin nucleus and an unidentified portion of the 5,6-dimethylbenziminazole base. It bore a close resemblance to vitamin B_{12} binding in human gastric juice.

2015 EFFECTS OF BILE DIVERSION ON THE LIPID-REESTERIFYING CAPACITY OF THE RAT SMALL BOWEL.

(E.) Tandon, R.; Edmonds, R. H.; Rodgers, J. B. (Albany Med. Coll., N. Y.). *Gastroenterology* 63(6):990-1003, 1972.

Sprague-Dawley rats were studied by the everted gut sac technique, incubating jejunal sacs in a micellar solution of radioactive free fatty acid. Rates of fatty acid esterification were determined in control and experimental sacs incubated for brief periods in solutions containing different concentrations of free fatty acid. Morphological studies were performed on these sacs, both before and after incubation. Direct enzymatic assays of acyl-coenzyme A ligase and acyl-coenzyme A: monoglyceride acyltransferase were also performed. All studies were made 72 hr after surgery. Maximal rates of oleic acid esterification by sacs were sustained for brief periods. Slight but definite histological abnormalities of the epithelial cells were evident after only 5 min and partial villous sloughing after 15 min of incubation. Studies were performed on sacs from both nonfasting and fasting control and bile fistula rats using brief periods of incubation. Rates of esterification were greater in sacs from either nonfasting or fasting control rats than in sacs from experimental rats under comparable condition. The activities of the mucosal lipid-reesterifying enzymes were greater in the control rats. Enzyme activities were greater in either nonfasting or fasting control groups than the corresponding experimental groups. Similar enzyme assays were performed in rats infused intraduodenally with a synthetic diet at a constant rate. Under these conditions, enzyme activities were still greater in control rats. Additional studies in experimental rats demonstrated that these enzyme activities could be maintained in the normal range by infusing artificial bile intraduodenally. Thus, in addition to causing lipid malabsorption by impairing micelle formation, bile diversion also has an adverse effect on the intracellular process of lipid absorption by producing a reduction in the lipid-reesterifying capacity of the small bowel.

2016 THE ABSORPTION OF α-TOCOPHEROL IN THE RAT. I. THE EFFECT OF DIFFERENT CARRIERS AND DIFFERENT DOSE LEVELS.

(E.) Kelleher, J.; Davies, T.; Smith, C. L.; Walker, B. E.; Losowsky, M. S. (St. James Hosp., Leeds, England). *Int. J. Vitam. Nutr. Res.* 42(3):394-402, 1972.

Absorption of single p.o. doses of DL(5-methyl-^{3}H) α-tocopherol was studied in Lister hooded rats by measuring fecal excretion of unabsorbed vitamin. Absorption was quantitatively the same when the vitamin was administered either in peanut oil, Tween emulsion, or alcohol suspension. However, the vehicle of administration had a great effect on subsequent tissue distribution of the absorbed vitamin. Radioactivity in the livers and kidneys of rats given α-tocopherol in Tween suspensions was over 20 and 30 times greater, resp. than that in the livers and kidneys of rats given tocopherol in peanut oil. The percentage absorption of the labeled vitamin was decreased when the p.o. dose was increased from 40 μg to 20 mg, equivalent to 2% of the dietary fat intake of the animals. This may be due to the existence of some saturable process which limits tocopherol absorption at these high dose levels.

2017 THE ABSORPTION OF α-TOCOPHEROL IN THE RAT. II. EFFECTS OF SOME PHYSIOLOGICAL FACTORS.

(E.) Kelleher, J.; Davies, T.; Smith, C. L.; Walker, B. E.; Losowsky, M. S. (St. James Hosp., Leeds, England). *Int. J. Vitam. Nutr. Res.* 42(3):403-412, 1972.

Absorption of single p.o. doses of radioactive α-tocopherol in peanut oil was studied in rats by measuring fecal excretion of unabsorbed vitamin. Neither fasting or vitamin E deficiency had a quantitative effect on absorption, but subsequent tissue levels of radioactivity were consistently higher in deficient animals at all times up to 7 days after administration; the vitamin status of the animal had a great effect on tissue distribution of absorbed radioactivity. This suggests either a slower turnover of α-tocopherol in deficient tissues, or a more prolonged uptake by such tissues. Increasing the dietary fat, resulting in quantitatively more fat being absorbed (though the percentage absorption was little altered) did not affect the absorption of the radioactive vitamin or its uptake or retention by the liver.

2018 MECHANISM OF HORSERADISH PEROXIDASE UPTAKE AND TRANSPORT IN ADULT AND NEONATAL RAT INTESTINE.

(E.) Walker, W. A.; Cornell, R.; Davenport, L. M.; Isselbacher, K. J. (Harvard Med. Sch., Boston, Mass.). *J. Cell Biol.* 54(2):195-205, 1972.

The mechanism of absorption of the tracer protein, horseradish peroxidase (HRP), was tested in neonatal and adult female albino Charles River rat gut sacs. Transport into serosal fluid was quantitated by enzymatic assay and monitored morphologically by histochemical techniques. A greater transport of HRP was noted in the adult jejunum than in adult ileum and neonatal intestine. Morphologically, the uptake mechanism in adult intestine was similar to the endocytosis previously reported in neonatal animals. HRP was first adsorbed to the microvillus membrane, then contained within membrane-enclosed droplets of the apical microtubular region, and finally contained in large vacuoles above the nucleus. Like other endocytotic processes, HRP uptake in adult rats is an energy-dependent process as determined by metabolic inhibitors and temperature-controlled studies. An understanding of the mechanism whereby macromolecules are bound to intestinal membranes and engulfed by them is necessary before the action of physiologic macromolecules such as enterotoxins can be established.

2019 EFFECTS OF SUGAR AND AMINO ACID TRANSPORT ON TRANSEPITHELIAL FLUXES OF SODIUM AND CHLORIDE OF SHORT CIRCUITED RAT JEJUNUM.

(E.) Munck, B. G. (Univ. of Pittsburgh, Sch. Med., Pa.). *J. Physiol.* 223:699-717, 1972.

The relation between short circuited current (I_{sc}) and unidirectional ion fluxes across the short circuited jejunum has been examined in male albino rats, using the Ussing Zerahn technique. These parameters of jejunal function were measured in absence of sugars and amino acids and in the presence of 10 mM glucose, 28 mM glucose, galactose, and 20 mM proline. Sulfate was used as a substitute for chloride on both sides of the gut wall, and potassium was used on the serosal side to substitute for sodium. Investigations were conducted to see whether sulfate and potassium substitutions significantly affected proline transport. The purpose was to examine the I_{sc} seen in the absence of sugars and amino acids and the ΔI_{sc} induced by these substances and to examine the validity of the hypothesis that jejunal transport of amino acids and sugars stimulates an electroneutral secretion of sodium chloride. In the absence of sugars and amino acids at least 2/3 of an I_{sc} of 50-70 μamps/cm^2 are accounted for by chloride secretion in the deep parts of the epithelium. The remaining 1/3 or less of the I_{sc} can be accounted for in terms of net flux of sodium. A state of hypoxia in the deep part of the epithelium causes the very low I_{sc}, potential difference, and electrical resistance usually found for sacs of everted rat jejunum. The increase in I_{sc} induced by proline and glucose is accounted for by the simultanously induced increase in mucosa to serosa flux of sodium. There is no compelling evidence that proline should increase I_{sc} by stimulating chloride secretion.

2020 PROSTAGLANDINS INHIBIT INTESTINAL SODIUM TRANSPORT.

(E.) Al-Awqati, Q.; Greenough, III, W. B. (Johns Hopkins Univ. Sch. Med., Baltimore, Md.). *Nature* [*New Biol.*] 238(79):26-27, 1972.

The effects of 2 prostaglandins (E, and $F_2\alpha$) on intestinal ion transport *in vitro* were compared with theophylline by using the intact mucosa of distal rabbit ileum. When prostaglandin E or $F_2\alpha$ or theophylline was added to serosal reservior, there was an immediate rise in short-circuit current which peaked in less than 2 min for the prostaglandins and 10 min for theophylline. Short-circuit current returned to normal except with theophylline with which it remained elevated. After addition of 10^{-5} M prostaglandin E_1, 10^{-5} M prostaglandin $F_2\alpha$, and 10^{-2} M theophylline, the net sodium movement dropped from 1.6 μEq/cm^2/hr to almost zero. The net chloride flux decreased by 1.7 μEq/cm^2/hr after the addition of $F_2\alpha$. These decreases were due to a decrease of the mucosal-to-serosal fluxes. Theophylline caused a reversal in the direction of net chloride movement. The residual ion flux was not changed after addition of prostaglandins E_1 or $F_2\alpha$ or theophylline. Addition of glucose (7.5-15 mM) to the mucosal solution after prostoglandin E_1 or $F_2\alpha$ or theophylline inhibit sodium absorption only through the glucose independent pathway. Thus, prostaglandins may produce diarrhea either by stimulating intestinal motility or mesenteric vascular changes, or by inhibiting sodium absorption and possibly by stimulating chloride secretion.

2021 THE INFLUENCE OF BLOOD FLOW AND WATER NET FLUX ON THE ABSORPTION OF TRITIATED WATER FROM THE JEJUNUM OF THE RAT.

(E.) Winne, D. (Pharmacol. Inst., Univ. Tubingen, Germany). *Naunyn Schmiedebergs Arch. Pharmakol.* 272(4):417-436, 1972.

Jejunal loops of anesthetized male Wistar rats were perfused with hypo-, iso-, and hypertonic buffered solutions containing tritiated water. The blood flow, the disappearance rate (from the intestinal lumen), and the appearance rate (in the intestinal venous blood) were determined simultaneously. The appearance and disappearance rate of tritiated water was diminished by a decrease of the blood flow from about 1.7 to 0.2 ml/min/g wet tissue weight. An increase of the blood flow caused the opposite result. The appearance rate was almost completely determined by the blood flow, indicating that intestinal absorption of tritiated water is blood-flow limited. Therefore the absorption rate of tritiated water does not adequately characterize the diffusive water permeability of the intestinal epithelium. A water net flux directed toward the blood accelerated and, toward the intestinal lumen retarded, the intestinal absorption of tritiated water at low, intermediate, and high blood-flow values. The data were analyzed by a modified four-compartment-model considering the variation of blood flow and water net flux. The water net flux influences the absorption of tritiated water during penetration through the epithelium by solvent drag and by changing the blood-flow rate through capillaries near the epithelium.

2022 EFFECT OF ANTIDIURETIC HORMONE ON THE NET WATER AND ELECTROLYTE TRANSPORT IN THE SMALL INTESTINE OF WAKING RATS.

(Ger.) Dennhardt, R.; Haberich, F. J. (Inst. Applied Physiol., Philipps Univ., Marburg, Germany). *Pfluegers Arch.* 334:74-84, 1972.

With a specially devised technique, jejunal and ileal segments of conscious rats were perfused in an extracorporeal, closed-circulation system. In order to determine the net fluxes, the changes in volume and electrolyte concentration of the perfusate were measured. Continuous i.v. infusion of arginine-vasopressin (antiduiretic hormone; ADH) in physiological doses (between 40 and 200 μU/min) caused a significant decrease in both volume and electrolyte (Na^+, Cl^-) absorption in the jejunum and in the ileum. This is true for perfusions with hypotonic (0.45% NaCl), isotonic (0.9% NaCl), or hypertonic (1.2% NaCl) solutiona. Sometimes net absorption was converted into net secretion in the presence of ADH. A quasi-linear dose-effect curve was found when infusions ranged from 20 to 100 μU ADH/min/100 g body weight. The absence of linearity at the beginning of the curve is due to the use of animals which are overhydrated in the control experiments.

2023 RATE-LIMITING BARRIERS IN INTESTINAL ABSORPTION.

(E.) Gibaldi, M.; Grundhofer, B. (Dept. of Pharmaceutics, Sch. Pharm., State Univ. New York at Buffalo). *Proc. Soc. Exp. Biol. Med.* 141(2):564-568, 1972.

The flux of various solutes across the normal intestine of the rat and across the rat intestine in which the epithelium was substantially disrupted was investigated. *In vitro* stidies were performed on everted jejunal segments from male Sprague-Dawley rats. *In situ* absorption rates were determined by the disappearance of test compounds from the entire small intestine of male Sprague-Dawley rats. The flux of relatively polar, poorly lipid-soluble molecules with clearance values of less than 0.02 ml/min across the intact intestine both *in vitro* and *in situ* increased markedly upon disruption of the epithelium by incubating with sodium deoxycholate or incubation and scraping. In contrast, the absorption of free lipid-soluble compounds was the same in the intact intestine and when the epithelium is disrupted or removed. The compounds tested were: aniline, ^{14}C-butanol, salicylamide, salicylate, sulfanilamide, bretylium tosylate, pyridine aldoxime methiodide, riboflavin, methyl orange, methylene blue, N,N-bis(phenylcarbamoylmethyl) dimethyl ammonium chloride, and benzocaine.

2024 THE EFFECT OF DIETARY MAGNESIUM DEFICIENCY ON CALCIUM TRANSPORT BY THE RAT SMALL INTESTINE. *(E.)* Krawitt, E. L. (Dept. Med., Univ. Vermont, Burlington). *Proc. Soc. Exp. Biol. Med.* 141(2):569-572, 1972.

The effect of dietary magnesium deprivation on intestinal calcium transport by the rat intestine was studied by using an *in vitro* everted gut sac technique as a measure of transport. Magnesium deficiency resulted in an insignficant decrease in the ability of the duodenum and more distal intestine to transport calcium, despite the development of hypercalcemia. The results suggest that the hypercalcemia may be mediated by a mechanism independent of an adaptive increase in intestinal calcium absorption.

2025 CHOLESTEROL DYNAMICS FOLLOWING PARTIAL ILEAL BYPASS VERSUS FOLLOWING PARTIAL ILEAL EXCISION IN THE RABBIT. *(E.)* Schwartz, M. Z.; Moore, R. B.; Varco, R. L.; Buchwald, H. (Univ. Minnesota Hosp., Minneapolis). *Surgery* 71(4):547-555, 1972.

In an initial study in 30 rabbits and in an auxiliary study in 40 rabbits the previously demonstrated difference in cholesterol concentration following ileal bypass versus ileal excision was again explored. Initial data showed no difference in cholesterol reduction between the operative procedures; auxiliary study gave only doubtful evidence of a significant difference and this only in the first 2 and 3 months following operation. Cholesterol dynamics were similar following bypass or excision: a 2.2- to 2.7-fold increase in the cholesterol synthesis rate; a 2.8- to 2.9-fold increase in steroid excretion; a 2.1- to 2.2-fold increase in cholesterol turnover. The correlation coefficient of total fecal steroid excretion to cholesterol turnover rates was +0.82.

2026 OBSERVATIONS ON THE ABSORPTIVE CAPACITY OF THE VISCERAL PERITONEUM. *(E.)* Alfieri, O.; Cademartiri, G.; Tazzi, A.; Ottaviani, G. (Inst. Hum. Anat., Univ. Parma, Italy). *Ateneo Parmense* 42(5):619-629, 1971.

2027 BILIARY EXCRETION OF MERCURY ENHANCED BY SPIRONOLACTONE. *(E.)* Haddow, J. E.; Fish, C. A.; Marshall, P. C.; Lester, R. (Boston Univ. Sch. Med., Mass.). *Gastroenterology* 63(6): 1053-1058, 1972.

2028 EFFECT OF GLUCOSE ON INTESTINAL PHENYLALANINE TRANSPORT IN THE PRESENCE AND ABSENCE OF DINITROPHENOL. *(Fr.)* Luisier, A. L.; Robinson, J. W. L. (Canton Hosp., Univ. Lausanne, Switzerland). *Experientia* 28(11):1313-1315, 1972.

2029 SPECIFICITY LIMITS OF L-LEUCINE TRANSPORT IN CHICKEN SMALL INTESTINE. *(E.)* Lerner, J.; Miller, D. S. (Dept. Biochem., Univ. Maine, Orono). *Experientia* 28(11):1312-1313, 1972.

2030 PERSISTENCE OF ACTIVE AND PASSIVE IONIC TRANSPORT DURING LOW-TEMPERATURE LIVER PRESERVATION. *(E.)* Lambotte, L. (Lab. Exp. Surg., Univ. Louvain, Belgium). *Surgery* 73(1):8-14, 1972.

2031 TRANSPORT OF ACETATE AND BUTYRATE IN THE HIND-GUT OF RABBITS. *(E.)* Henning, S. J.; Hird, F. J. R. (Russell Grimwade Sch. Biochem., Univ. Melbourne, Parkville, Australia). *Biochem. J.* 130(3):791-796, 1972.

2032 FRACTIONAL INTESTINAL CALCIUM ABSORPTION IN AZOTEMIC RATS IN VIVO. *(E.)* Binswanger, U.; Tammilehto, E. (Dept. Intern. Med., Univ. Zurich, Switzerland). *Res. Exp. Med.* 158(2):123-128, 1972.

2033 MEMBRANE PROCESSES AND TRANSPORT OF SUBSTANCES THROUGH EPITHELIAL CELLS IN THE INTESTINE WHEN SOME VISCERA HAVE BEEN REMOVED OR STIMULATED. *(Uk.)* Faitel'berg, R. O.; Nguyen, T. L. (Dept. Physiol., State Univ., Odessa, USSR). *Fiziol. Zh.* 18(4):521-528, 1972.

2034 A MODIFICATION OF WILSON AND WISEMAN'S METHOD FOR APPLICATION TO THE GASTROINTESTINAL TRACT OF THE TENCH (*Tinca tinca L.*): "DEMUSCULATED POUCH" TECHNIQUE. *(Fr.)* Buclon, M. (Lab. Cell Physiol., Claude Bernard Univ., Lyon-Villeurbanne, France). *C. R. Soc. Biol. (Paris)* 165(11):2118-2122, 1971.

2035 OBSERVATIONS OF INTESTINAL SUGAR TRANSPORT USING A FLUX CHAMBER. *(Jap.)* Hara, Y.; Takahashi, I.; Wakasugi, H. (Kyushu Univ. Sch. Med., Fukuoka, Japan). *Med. Biol.* 84(5):267-272, 1972.

2036 THE EFFECT OF METHYLTESTOSTERONE ON Ca^{45} UPTAKE IN ISOLATED SMOOTH MUSCLE FROM RAT DUODENUM. *(E.)* Hava, M. (Univ. Kansas Med. Ctr., Kansas City). *Arch. Int. Pharmacodyn. Ther.* 195(2):315-319, 1972.

2037 EFFECT OF VITAMIN D SUPPLEMENTS ON CALCIUM ABSORPTION IN CHILDREN. *(E.)* Perera, W. D. A.; Reddy, V. (Natl. Inst. Nutr. Indian Counc. Med. Res., Jamai-Osmania, Hyderabad). *Indian J. Med. Res.* 59(6):961-964, 1971.

2038 THE ENTEROHEPATIC CIRCULATION OF BILE SALTS. *(E.)* Small, D. M.; Dowling, R. H.; Redinger, R. N. (Boston Univ. Sch. Med., Mass.). *Arch. Intern. Med.* 130(4):552-573, 1972.

2039 CARBOHYDRATE ABSORPTION CAPACITY AFTER EXTENSIVE EXPERIMENTAL RESECTION OF THE SMALL INTESTINE. *(Pol.)* Mrozowski, D.; Parszewski, M.; Semanycz, J. (Pomeranian Acad. Med., Szczecin, Poland). *Patol. Pol.* 23(3):383-385, 1972.

2040 AN OVERVIEW OF INTESTINAL ABSORPTIVE AND SECRETORY PROCESSES. *(E.)* Schultz, S. G.; Frizzell, R. A. (Univ. Pittsburgh Sch. Med., Pa.). *Gastroenterology* 63(1):161-170, 1972.

See also 2143, 2224, 2509, 2595.

MOTILITY

2041 ELECTRIC AND MOTOR ACTIVITY OF INNERVATED AND VAGALLY DENERVATED FELINE ESOPHAGUS. *(E.)* Ueda, M.; Schlegel, J. F.; Code, C. F. (Mayo Clin., Rochester, Minn.). *Am. J. Dig. Dis.* 17(12): 1075-1088, 1972.

Intraluminal pressure detectors and chronically implanted platinum electrodes were used to detect motor and electric activities of the esophagus in 6 healthy adult cats before and after vagotomy. These were placed in the midesophagus (E_1), at the three-quarter point (E_2), and in the lower 2 cm (E_3). Both inner and outer layers of muscle were skeletal at E_1 and smooth at E_3, whereas at E_2 the outer layer was predominantly skeletal and the inner predominantly smooth. Contractions of the skeletal muscle fibers of the midesophagus were associated before vagotomy with pressure changes and action potentials of lesser amplitude, briefer duration, and faster propagation than those of the smooth muscle fibers of the lower esophagus. The frequency of the skeletal muscle action potentials was greater than 25 cycles/sec; that of the smooth muscle action potentials, was less than 25 cycles/sec. Orad movement of the electrodes due to contraction of longitudinal fibers was the first recorded event during peristalsis. After vagotomy, action potentials occurred with nearly every stimulation, but the incidence of intraluminal pressure increases was reduced. Repetitive responses were common. Action potentials with frequencies faster than 25 cycles/sec were eliminated in the lower quarter of the esophagus where orad movement of electrodes was also abolished owing to paralysis of longitudinal muscle fibers. The incidence of peristalsis was reduced during the first month after vagotomy to 33-44% of responses, but thereafter its occurrence improved to 40-80% of responses. Persistent weakness, incoordination, and repetitive responses in the lower esophagus, which prevented normal emptying of the organ, were the predominant electromotor features of the period after vagotomy.

2042 THE EFFECT OF ELECTRICAL STIMULATION OF THE HEPATIC PERIARTERIAL NERVE PLEXUS AND OF THE SYMPATHETIC AND PARASYMPATHETIC NERVES ON THE DYNAMICS OF THE BILIARY TRACT OF THE DOG. *(E.)* Satler, J. J.; Sakakihara, Y.; Nusbaum, M.; Tumen, H. J. (Univ. Lijubljana Med. Clin., Yugoslavia). *Acta Hepatogastroenterol.* 19(4):234-241, 1972.

In 16 anesthetized dogs a study was made of biliary pressure responses to both brief and prolonged stimulation by an electrical pacemaker of the hepatic periarterial nerve plexus and of the splanchnic and parasympathetic nerves. Electrical stimulation of the hepatic periarterial nerve plexus for 10 min caused oscillation in common bile duct pressure After discontinuation of the stimulation, the pressure decreased to the prestimulation value. Continuous plexus stimulation for 3 hr resulted in a progressive decline in the oscillating common bile duct pressure curve to well below the prestimulation values. The pressure changes at first were due to contractions of the gallbladder and closing of the spincter of Oddi, simulating a hypertonic form of biliary dyskinesia. Then continuous plexus stimulation stopped gallbladder contractions and relaxed the sphincter of Oddi, inducing a state of hypotony of the extrahaptic biliary tract. Stimulation of the isolated sympathetic nerve caused strong gallbladder contractions, oscillations in intrabiliary pressure, and closure of the sphincter Oddi. These effects were abolished with bretylium (1 mg/kg i.v.) application but were not affected by atropine (0.2 mg/kg i.v.). Stimulation of the parasympathetic nerve resulted in a steady increase in pressure within the biliary system which depended upon the strengh of the current, and intermittent opening and closing of the sphincter of Oddi. These effects were blocked by atropine. There may be a relation between these findings and those in hypertonic and atonic biliary dyskinesia.

2043 CONTROL OF GASTRIC EMPTYING BY AMINO ACIDS. *(E.)* Cooke, A. R.; Moulang, J. (VA Hosp., Iowa City, Iowa). *Gastroenterology* 62(4):528-532, 1972.

Studies were made of gastric emptying of various concentrations of glycine, β-alanine, L-Leucine, L-lysine, and DL-methionine in 6 healthy males. Gastric contents were analyzed for phenol red concentration and titratable acidity 20 min after ingestion of 350 ml test meals containing phenol red (40 mg/liter) and the appropriate amino acid. There was no significant difference between the rate of gastric emptying for water and the other amino acids at a concentration of 100 mM, except for DL-methionine which emptied at a slower rate. At concentrations of 0.2 M all amino acids delayed emptying significantly when compared with test meals containing water and phenol red only. The delay in emptying was related to the molar concentrations of the amino acid in the test meal and was unrelated to the molecular weight of the amino acid or to the amount of acid secreted. Acid output decreased with increasing amino acid concentration in test meals. The results of these studies indicate that gastric emptying of amino acids is related to their osmolar concentration. Most subjects developed diarrhea from L-lysine, and β-alanine caused intense tinnitus and paresthesias in all subjects during the experiment.

2044 ALTERATION OF LOWER ESOPHAGEAL SPHINCTER CHARACTERISTICS WITH RESPIRATION AND PROXIMAL ESOPHAGEAL BALLOON DISTENTION. *(E.)*

Winans, C. S. (Univ. Chicago Hosp., Illinois). *Gastroenterology* 62(3):380-388, 1972.

The location, length, and magnitude of the lower esophageal high pressure zone were studied in 11 healthy human subjects by using the manometric recording catheter as both a measuring stick and a pressure detecting device. The high pressure zone was located 1-3 cm more distal at end-inspiration than at end-expiration. In both phases of respiration the mean length (3 cm) and magnitude (22 mm Hg) of the resting high pressure zone were similar. An upward movement of the high pressure zone followed distention of the proximal esophagus by a balloon, accompanied by a 40% shortening of the high pressure zone and a 65% decrease in its magnitude. Whereas the movement of a sphincter segment relative to the recording orifice during the respiratory cycle can explain the pressure fluctuations within the resting high pressure zone, a combination of positional change and diminished sphincter tone best explains the fall in pressure within the high pressure zone after balloon distention and, probably, after swallowing. It is possible that sphincter length, as well as sphincter magnitude, is an important determinant of sphincter competence.

2045 CHANGE IN SLOW-WAVE FREQUENCY GRADIENT OF SMALL INTESTINES IN DIFFERENT FUNCTIONAL STATES. *(E.)*

Kortezova, N. I.; Papazova, M. (Inst. Physiol., Bulgarian Acad. Sci., Sofia). *Dokl. Bolgar. Akad. Nauk* 25(9):1289-1292, 1972.

By implanting 11 electrodes in the subserosa of the small intestine in each of 5 anesthetized dogs, a study was made of the frequency gradient of slow waves, accompanied by spontaneous spikes or induced by carbocholine (7-8 µg/kg), atropine (150-200 µg/kg), or hexamethonium (2 mg/kg). The frequency in the duodenum ranged from 18.87-20.69 cycles/min; in the lower jejunum, from 15.57-16.39; and at the end of the ileum, from 14.46-15.51. At some times, slow waves with spike potentials were found only in some of the leads. At the onset, spike activity first appeared in the duodenal lead and gradually spread to lower parts of the small intestine. The appearance of spike potentials was accompanied by a decrease in the slow-wave frequency in all segments of the intestine. Drug-induced spike potentials produced a more marked decrease in slow-wave frequency. Atropine stopped spike activity in the first min, while the slow-wave frequency simultaneously approached the level characteristic of the small intestine at rest. Hexamethonium had a similar action. The slow-wave frequency decreased significantly within 10 min after carbocholine. Lower parts of the small intestine decrease the frequency still further so that the frequency gradient of the slow wave is maintained.

2046 ELECTRICAL ACTIVITY IN MYENTERIC AND SUBMUCOUS PLEXUSES OF CAT INTESTINE. *(E.)*

Ohkawa, H.; Prosser, C. L. (Dept. Physiol. Biophys., Univ. Illinois, Urbana). *Am. J. Physiol.* 222(6): 1412-1419, 1972.

Measurements were made *in vitro* on ganglion cells of the myenteric and submucous plexus of cat small intestine and colon. In bursts of high frequency some cells discharge spontaneously; others fire single spikes. These electrical activities were similar in the two plexuses. By increasing intraluminal pressure burst activity in each plexus was enhanced. Periarterial stimulation decreased amplitude of slow waves of the longitudinal muscle, but no significant effect was observed on spontaneous bursting neurons of the myenteric plexus. Intraburst interaction between neurons in one ganglion was observed, but no correlation was observed between burst activity of adjacent ganglia. This indicates that the plexuses cannot be considered as functional nerve nets. An inverse correlation was noted between burst activity of submucous plexus neurons and spontaneous spiking of circular muscle. One of the functions of the enteric plexus neurons is tonic inhibition of spontaneous spiking in circular muscle.

2047 ELECTRICAL ACTIVITY OF THE CAT DUODENUM IN FASTING AND VOMITING. *(E.)*

Weisbrodt, N. W.; Christensen, J. (Univ. Texas Med. Sch., Houston). *Gastroenterology* 63(6):1004-1010, 1972.

Monopolar electromyograms from duodenum and proximal jejunum were made with 8 electrodes implanted chronically in 6 male cats, after feeding and fasting, in fasted animals given neostigmine and atropine, and in animals made to vomit with morphine. Feeding, fasting, or atropine affected neither slow wave velocity or frequency. Neostigmine increased while atropine decreased the proportion of slow waves bearing spike potentials in fasting. After a prolonged fast, slow waves were periodically interrupted by long burst of spike potentials, migrating slow aborad. Slow waves were not detected at first thereafter; when they returned they first phase-locked orad, then reorganized into phase-lock aborad. A similar long burst of spike potentials, migrating orad, suggesting an antiperistaltic contraction of the small bowel, preceded vomiting. Slow waves were not detected at first thereafter; when they returned, they were not phase-locked or phase-locked orad. They later became phase-locked aborad. The direction of slow wave phase-lock varies physiologically. The long spike burst, occurring in fasting and vomiting, is an independent phenomenon capable of giving a vector to duodenal movements; its direction varies physiologically. These experiments reveal that retrograde peristalsis in cat duodenum can occur in fasting and vomiting through 2 separate mechanisms.

2048 EFFECT OF GASTRIC CONTRACTIONS ON THE LOWER ESOPHAGEAL SPHINCTER. *(E.)*

Diamant, N. E.; Akin, A. N. (Toronto Western Hosp., Canada). *Gastroenterology* 63(1):38-44, 1972.

Simultaneous intraluminal pressure records were obtained from the lower esophagus, gastroesophageal sphincter, upper and lower stomach, and rectum in 6 healthy, trained, unanesthetized dogs. In all animals a marked increase in lower esophageal sphincter pressure occurred with increased intragastric pressure due to gastric contrations. The lower esophagus above the sphincter was quiescent during this activity. When intragastric pressure increased due to increased intra-abdominal pressure, a sphincter response still appeared, and when a gastric contraction occurred during this period, another increase in sphincter pressure developed in association with the gastric contraction. This sphincter response appeared only when intragastric pressure change was noted in the upper end of the stomach and the change in sphincter pressure was closely related to the change in upper stomach pressure, in a ratio of approximately 8:1. The sphincter response was not modified by the level of resting sphincter pressure.

2049 ELECTRICAL SLOW WAVE OF THE PROXIMAL COLON OF THE CAT IN DIARRHEA. *(E.)*

Christensen, J.; Weisbrodt, N. W.; Hauser, R. L. (VA Hosp., Iowa City, Iowa). *Gastroenterology* 62(6):1167-1173, 1972.

Six electrodes, applied to the exposed circular muscle layer in the proximal colon of the cat, were spaced equally in a straight line over a distance of 28.8 mm. Studies were made in both longitudinal and transverse axes, just below the ileocecal junction. Four groups of animals were studied: (1) 20 apparently healthy cats; (2) 12 cats with spontaneous diarrhea probably due to infection; (3) 12 cats treated with corn oil; (4) 12 cats treated with castor oil to induce diarrhea. In diarrheic animals there was a significant reduction in the proportion of time during which slow waves appeared to be conducted uniformly across all 6 electrodes in both axes. That is, the number of pacemakers operating simultaneously in this segment increased. Also, during uniform conduction, patterns of spread were such that there appeared to be more pacemakers in diarrheic than in healthy animals. Apparent velocity of spread in the transverse axis was increased in both groups of animals treated with oils. After each oil, the degree of coupling differed significantly from that found in both healthy cats and in cats with spontaneous diarrhea. Slow wave frequency was slightly diminished in all diarrheic animals.

2050 GRADIENTS OF CONTRACTIONS IN THE OPOSSUM ESOPHAGUS. *(E.)*

Weisbrodt, N. W.; Christensen, J. (VA Hosp., Iowa City, Iowa). *Gastroenterology* 62(6):1159-1166, 1972.

Contractions of longitudinal and circular smooth muscle strips from the opossum esophagus were monitored *in vitro*. KCl-induced contractions were recorded isometrically, and the time intervals between rhythmic contractions were measured by computer. In longitudinal muscle strips, the interval between contractions increased progressively from 1.95 sec for strips taken 6 cm from the gastroesophageal junction to 3.15 sec for strips taken 1 cm from this junction. There was no gradient in circular muscle strips. Contractions were also induced by transmural electrical stimulation. The ability of strips to follow stimuli at progressively shorter interstimulus intervals was determined. Circular muscle strips, but not longitudinal muscle strips, showed a gradient in the ability to follow high frequency stimulation. The stimulus-response delay was determined with transmural electrical stimulation. For circular muscle strips, the delay increased from 0.8 sec for strips taken 12 cm from the gastroesophageal junction to 2.2 sec for strips taken 1 cm from this junction. No gradient existed for longitudinal muscle strips. Thus, differences exist over very short segments of the esophagus, in the nerves, muscle, or both, which may partially account for peristaltic movements. It is suggested after a swallow, the responsibile nerves (probably nonadrenergic inhibitory nerves) to the entire smooth muscle segment are excited simultaneously, inhibiting the circular muscle. Since all of the muscle except the distal esophageal sphincter is already maximally inhibited, relaxation occurs only at the distal esophageal sphincter. On recovery from this inhibition, the muscle at all levels undergoes a rebound contraction. Because of the gradient in latency of this contraction, this response appears as a peristaltic sweep down the esophagus.

2051 LOWER ESOPHAGEAL SPHINCTER RELAXATION: STUDIES ON THE NEUROGENIC INHIBITORY MECHANISM. *(E.)*

Tuch, A.; Cohen, S. (Univ. Pennsylvania Hosp., Philadelphia). *J. Clin. Invest.* 52(1):14-20, 1973.

The physiological mechanism of lower esophageal sphincter relaxation was studied in 33 adult opossums. Circular muscle of the esophagus, lower esophageal sphincter, and stomach were evaluated for their inhibitory response to electrical stimulation during a maintained tonic contraction produced by superfusion of acetylcholine and physostigmine. Only the circular muscle to the distal esophagus showed an inhibitory response to electrical stimulation. The maximal inhibition of lower esophageal sphincter

scle was 63.9±5.9% of the acetylcholine-
roduced tension and occurred at 80 V. Esophageal
rcular muscle 2-3 cm above the lower esophageal
hincter showed stimulus-related decreases in ten-
on. Esophageal circular smooth muscle 4 cm above
e lower esophageal sphincter and gastric muscle
re not inhibited at frequencies of 20-50 cycles/sec
20-80 V. The inhibitory response of lower
ophageal sphincter muscle was antagonized by
trodotoxin and hexamethonium but not by
ecific antagonists. Adrenergic nerve destruction
llowing 6-hydroxydopamine also did not abolish
e lower esophageal sphincter inhibiton. These
ta indicate that the distal esophagus, at
e zone of the manometrically determined lower
ophageal sphincter, is characterized by a
nadrenergic neural inhibitory system. These
rves may mediate lower esophageal sphincter
laxation.

52 MOVEMENT OF THE FELINE ESOPHAGUS
ASSOCIATED WITH RESPIRATION AND
RISTALSIS: AN EVALUATION USING TANTALUM
RKERS. *(E.)* Dodds, W. J.; Stewart, E. T.;
dges, D.; Zboralske, F. F. (Stanford Univ.
h. Med., California). *J. Clin. Invest.*
(1):1-13, 1973.

each of 5 cats the outer, lateral walls in
e distal half of the esophagus were labeled
th small tantulum wires. Esophageal motion
sociated with respiration and peristalsis,
duced by bolus injection of barium (5 ml each)
to the proximal esophagus, was recorded
out 8 weeks later on cine- and serial biplane
entgenograms with simultaneous recording of
traluminal esophageal pressures by manometry.
ophageal motion was also evaluated without
acement of a manometric tube. The coordinates
r each marker were digitized, and a computer
s used to plot marker position against time.
e markers passively made a shallow 2-10 nm
cursion on the longitudinal esophageal axis
ring respiration. This movement was synchronous
th thoracic and diaphragmatic movement and
anges in intraluminal esophageal pressure.
mediately after onset of peristalsis, the
rkers made a pronounced orad movement of 10
or more above their mean respiratory position.
if to engulf the bolus. Markers in opposing
ophageal walls approximated one another and
mmenced an aborad movement as the bolus tail,
ich was essentially coincident with onset
the manometric pressure complex, passed the
rker sites. With passage of the pressure com-
ex peak the markers returned to their rest
sitions and then moved below these positions.
e aborad excursion occurred predominantly
ter the bolus had emptied into the stomach.
e magnitude and duration of orad excursion were
gnificantly greater for the distal than for
r the proximal than for the more distal markers.
ring the peristaltic sequence, the labeled portion
the esophagus shortened from 26-46% of its
sting length. No evidence of esophageal torque
s shown. These findings suggest that both the
ngitudinal and circular esophageal musculature
are important during peristaltic transport of a bolus through the esophagus.

2053 ETHANOL-INDUCED ACUTE ESOPHAGEAL MOTOR DYSFUNCTION. *(E.)* Hogan, W. J.; Viegas de Andrade, S. R.; Winship, D. M. (Med. Coll. Wisconsin, Milwaukee). *J. Appl. Physiol.* 32(6): 755-760, 1972.

Esophageal motor function has been investigated in 12 healthy humans (10 males, 2 females; 23-36 yr old) during acute intoxication following p.o. or i. v. ethanol. The p.o. dose was 10 ounces of 86 proof bourbon whiskey taken in 3 divided doses over 1 hr. The i.v. dose was 15 ml/kg of a 9.5% (v/v) ethanol solution in 5% aqueous dextrose administered over 90 min. No subject had evidence of gastrointestinal disease nor consumed alcohol more than occasionally. Manometry was performed before and during intoxication and, in some instances, 8 and 24 hr later. Control studies without ethanol were performed to observe any influence from prolonged intubation. Plasma ethanol levels were imperfectly correlated with degree of intoxication or severity of esophageal dysfunction. Significant findings after either route of ethanol administration were reduction in incidence of primary peristalsis in the distal esophagus; decrease in yield pressure and contraction amplitude of the lower esophageal sphincter; and reduction of upper esophageal sphincteric yield pressure. Ethanol (i.v.) also decreased frequency of lower sphincteric relaxation after swallowing and secondary peristalsis after balloon distention. Unexpectedly, lower esophageal sphincteric yield pressure and contraction amplitude increased significantly during the control study. Esophageal motor function was normal 8 and 24 hr after ethanol was administered. Acute ethanol intoxication causes a reversible disturbance in esophageal motor function affecting both sphincteric dynamics and the incidence of peristaltic dynamics and the incidence of peristaltic response to swallows and esophageal distention.

2054 CIRCULAR MUSCLE ELECTROMYOGRAM IN THE CAT COLON: LOCAL EFFECT OF SODIUM RICINOLEATE. *(E.)* Christensen, J.; Freeman, B. W. (U.S. VA Hosp., Iowa City). *Gastroenterology* 63(6):1011-1015, 1972.

The colon electromyogram was recorded *in vitro* from the proximal colon of healthy adult cats during exposure to sodium ricinoleate and sodium oleate at 5×10^{-9} to 10^{-5}M. Records were read for the proportion of time of slow-wave congruence, for slow-wave frequency, for slow-wave velocity, and for the incidence of spike potentials. Also, the electrical activity of the circular muscle was recorded in the sucrose gap during exposure to sodium ricinoleate to determine effects of the agents on slow-wave amplitude. Ricinoleate, but not oleate, reduced the proportion of time when slow waves were congruent. This dose-related effect represents the excitation of ectopic pacemakers. The proportion of slow waves bearing spike potentials was not affected by either fatty acid. Frequency and velocity of slow waves were not affected. Ricinoleate slightly reduced amplitude at very high concentrations (10^{-5} and 10^{-6}M). The effect on congruence is like that seen previously in association with spontaneous and castor oil-induced diarrhea in cats.

2055 STUDIES ON THE PATHOGENESIS OF "STRESS ULCER": ELECTRICAL POTENTIAL DIFFERENCE AND IONIC FLUXES ACROSS CANINE GASTRIC MUCOSA DURING HEMORRHAGIC SHOCK. *(E.)* Ritchie, Jr., W. P.; Fischer, R. P. (Walter Reed Army Med. Ctr., Washington, D. C.). *J. Surg. Res.* 3(12):173-179, 1972.

The electrical potential difference (PD), lumen to serosa) was continuously monitored and the net fluxes of water, hydrogen ion, sodium, potassium, and chloride and the bidirectional fluxes of sodium were assessed in 3 groups of adult dogs provided with vagally denervated fundic pouches. Each dog served as its own control. Group I consisted of 10 dogs studied after 2 hr of severe hemorrhagic shock; Group II consisted of 7 dogs studied after 2 hr of anesthesia alone; and Group III consisted of 7 dogs studied after the topical application of 2 M urea to the pouch mucosa. During early hemorrhagic shock, mucosal permeability was not increased, as is the case with urea. Rather, as a consequence of reduced net chloride flux, the PD was decreased, permitting intraluminal cations, including hydrogen ion, to diffuse out of the pouch more rapidly and extraluminal cations to diffuse into the pouch loss rapidly, in accordance with the Ussing equation. The physiologic consequence of increased back diffusion of hydrogen ion in the absence of increased mucosal permeability is unclear. Hydrogen ion may be responsible for the damage after urea instillation when mucosal permeability is increased. Enhanced back diffusion resulting from a fall in PD may be equally damaging. If such back diffusion is important in the etiology of stress ulcer, PD measurement may be used to assess the condition.

2056 RADIOTELEMETRIC EXAMINATION OF THE EVACUATORY FUNCTION OF THE STOMACH AFTER INGESTION OF FOOD. *(Rus.)* Shevchenko, I. S.; Dovgusha, V. V. (S. M. Kirov Acad. Milit. Med., Leningrad, USSR). *Vopr. Pitan.* (4):20-23, 1972.

2057 SIGNIFICANCE OF THE Ca^{++}:Na^{+} RATIO TO THE GENERATION OF SLOW POTENTIALS FROM THE SMOOTH MUSCLE OF A CAT'S STOMACH. *(E.)* Papazova, M. P.; Loukanov, Y.; Boev, K. K. (Inst. Physiol., Bulgarian Acad. Sci., Sofia). *Dokl. Bolgarskoi Akademii Nauk (Sofia).* 25(6):849-852, 1972.

2058 THE ANALYSIS OF ADRENERGIC RECEPTIVE MECHANISMS IN THE GALLBLADDER. *(Ch.)* Lee, W.-H.; Fujiwara, M. (Dept. Pharm., Fac. Med., Kyoto Univ., Japan). *J. Formoson Med. Assoc.* 71(4):240-244, 1972.

2059 AN ANALYSIS OF THE GASTRIC STASIS INDUCED BY PYROGEN: THE EFFECTS ON INTRINSIC AND EXTRINSIC MOVEMENTS OF THE RUMINANT FORESTOMACH. *(E.)* Leek, B. F.; van Miert, A. S. J. P. A. M. (Dept. Vet. Physiol., Univ. Edinburgh, Scotland). *Rendic. R. Gastroenterol.* 3(3):163-167, 1971.

2060 PROXIMAL JEJUNAL AND DISTAL ILEAL EXTRINSIC INNERVATION IN THE RABBIT AND DOG. *(E.)* Jenkins, D. H. R.; Macleod, I. B. (Univ. Hosp., Cardiff, Wales). *Br. J. Surg.* 59(5):394-400, 1972.

2061 MOTILITY OF THE SMALL BOWEL. *(E.)* Earlam, R. J. (London Hosp., England). *Br. J. Hosp. Med.* 7(6):741-750, 1972.

2062 SEROTONIN RECEPTOR PROTECTION EXPERIMENTS ON THE ISOLATED RAT STOMACH FUNDUS PREPARATION. *(E.)* Frankhuijzen, A. L.; Bonta, I. L. (Med. Fac. Rotterdam, Netherlands). *Arch. Int. Pharmacodyn. Ther.* 197(2):378-379, 1972.

2063 NEUROGENIC FACTORS INVOLVED IN THE RELAXING EFFECT OF BRADYKININ ON THE ISOLATED GUINEA-PIG ILEUM. *(E.)* Hall, D. W. R.; Bonta, I. L. (Med. Fac. Rotterdam, Netherlands). *Arch. Int. Pharmacodyn. Ther.* 197(2):380-381, 1972.

2064 EFFECT OF ANESTHESIA ON GASTRIC MOTOR ACTIVITY IN CHILDREN SHORTLY AFTER SURGERY. *(Rus.)* Volozin, F. Z. (N. I. Pirogov 2nd Moscow Med. Inst., USSR). *Vestn. Akad. Med. Nauk SSSR* 27(7):51-55, 1972.

2065 A NEW PROCEDURE FOR FUNCTIONAL ANALYSIS OF THE LOWER ESOPHAGEAL SPHINCTER (LES). *(E.)* Waldeck, F. (C. H. Boehringer & Sons, Ingelheim/Rhine, Germany). *Pfuegers Arch.* 335(1):74-84, 1972.

2066 POSTOPERATIVE GASTRIC ILEUS. *(E.)* Dubois, A.; Watanabe, A. M.; Kopin, I. J. (Lab. Clin. Sci., Natl. Inst. Mental Health, Bethesda, Md.). *Am. J. Dig. Dis.* 18(1):39-42, 1973.

2067 EFFECT OF PROSTAGLANDIN $F_{2\alpha}$ AND GASTRIN PENTAPEPTIDE ON THE LOWER ESOPHAGEAL SPHINCTER. *(E.)* Rattan, S.; Hersh, T.; Goyal, R. K. (Baylor Coll. Med., Houston, Tex.). *Proc. Soc. Exp. Biol. Med.* 141(2):573-575, 1972.

2068 PERISTALTIC ACTIVITY OF ISOLATED STOMACH AND ITS MODIFICATION BY DRUGS. *(E.)* Sharma, M. L.; Jayaswal, C. L.; Deshpande, V. R. (Med. Coll., Nagpur, India). *Indian J. Physiol. Pharmacol.* 16(1):87-91, 1972.

2069 EFFECTS OF METOCLOPRAMIDE ON THE LARGE INTESTINE. II. EXPERIMENTAL CONTRIBUTION. *(It.)* Mereto, G. C.; Aliotta, P.; Grosso, G. (Munic. Genoa, Italy). *Minerva Anestesiol.* 38(5):279-283, 1972.

2070 EFFECTS ON METOCLOPRAMIDE ON THE SMALL INTESTINE. I. EXPERIMENTAL CONTRIBUTION. *(It.)* Mereto, G. C.; Aliotta, P.; Grosso, G. (Munic. Hosp., Genoa, Italy). *Minerva Anestesiol.* 38(5):271-278, 1972.

See also 1986, 2055.

SECRETION AND METABOLISM

2071 DECARBOXYLATION OF ORALLY ADMINISTERED L-DOPA IN THE HUMAN DIGESTIVE TRACT. *(E.)* Bergmark, J.; Carlsson, A.; Granerus, A. K.; Jagenburg, R.; Magnusson, T.; Svanborg, A. (Dept. Clin. Chem., Univ. Gothenburg, Sweden). *Naunyn Schmiedeburgs Arch. Pharmakol.* 272(4):437-440, 1972.

Carboxyl labeled L-dopa was administered p.o. and i.v. to 8 parkinsonian patients (51-76 yr) and 6 control subjects (45-80 yr). Total radioactivity was measured in the expired air, urine, and plasma. The activity in plasma was also measured before and after removal of carbon dioxide-bicarbonate. About 4 times more radioactivity was recovered in the urine after i.v. administration than after p.o. administration with a roughly corresponding decrease in the recovery from expired air; a considerably smaller proportion of the total radioactivity in plasma was derived from carbon dioxide-bicarbonate. The major fraction of the p.o. administered L-dopa undergoes decarboxylation in the digestive tract before reaching the general circulation. The extent of the decarboxylation occurring in the gastrointestinal lumen, mucosa, or liver is unknown. No difference was observed between the parkinsonian and the non-parkinsonian group.

2072 ACTIVATION OF ADENYL CYCLASE IN A PANCREATIC ISLET CELL ADENOMA BY GLUCAGON AND TOLBUTAMIDE. *(E.)* Levey, G. S.; Schmidt, W. M. I.; Mintz, D. H. (Univ. Miami Sch. Med., Fla.). *Metabolism* 21(2):93-98, 1972.

2073 RATE OF CHOLESTEROL TURNOVER PROCESSES. IV. EFFECT OF AGE, WEIGHT, SEX, GESTATION, AND LACTATION IN THE RAT. *(Fr.)* Lutton, C.; Chevallier, F. (Lab. Physiol. Nutr., Fac. Sci., Orsay, France). *Biochim. Biophys. Acta* 280(1):116-130, 1972.

See also 2040, 2188, 2215.

SECRETION AND METABOLISM

Stomach

2074 PHOSPHORYLATED-INTERMEDIATE OF MICROSOMAL ATPase FROM RABBIT GASTRIC MUCOSA. *(E.)* Tanisawa, A. S.; Forte, J. G. (Dept. Physiol. Anat., Univ. California, Berkeley). *Arch. Biochem. Biophys.* 147(1):165-175, 1971.

Intermediate reactions of an active Mg^{++}-dependent ATPase found in a microsomal fraction isolated from rabbit gastric mucosa was studied using gamma-labeled ^{32}P ATP. At least 2 general types of ^{32}P-labeling can be demonstrated, one exhibiting rapid formation and turnover and sensitivity to hydroxylaminolysis; the other revealing slow formation and turnover and insensitivity to the hydroxylamine treatment. The former type of labeling was consistent with the rapid ATPase activity and thus was studied further. The ^{32}P-label was not extractable with lipid solvents, and the pH lability profile and sensitivity to hydroxylamine suggest an acyl phosphate linkage. Incorporation required Mg^{++}, however, Na^{+} and ouabain did not alter its formation; this distinguished it from the ATPase found in tissues which primarily transports Na^{+} and K^{+}. Thiocyanate reduced the ATPase activity and the intermediate was increased; whereas, K^{+}, which has been found necessary for acid secretion, stimulated ATPase activity while the intermediate was decreased. It is suggested that SCN^{-} and K^{+} act by either diminishing or accelerating, resp., the ultimate dephosphorylation of the intermediate. However, there are other possibilities relating to the energy transduction steps.

2075 UPPER INTESTINAL MICROFLORAL CONTROL: EFFECTS OF GASTRIC ACID AND VAGAL DENERVATION ON BACTERIAL CONCENTRATIONS. *(E.)* Broido, P. W.; Gorbach, S. L.; Condon, R. E.; Nyhus, L. M. (Abraham Lincoln Sch. Med., Chicago, Ill.). *Arch. Surg.* 106(1):90-93, 1973.

Dogs were divided into 3 groups of 5 each: (1) 90% proximal gastrectomy resulting in achlorhydria;

(2) division of the celiac and hepatic branches of the vagal nerves (the vagal innervation to the stomach remained intact); and (3) truncal vagotomy and antrectomy. Intestinal content obtained from the stomach, duodenum, jejunum, and ileum by direct needle aspiration at the initial operation and 4 weeks later was cultured aerobically and anaerobically in 9 media. Significant increases in the concentration of coliforms occurred in achlorhydric animals (groups 1 and 3); the concentration of clostridia also increased significantly in group 3 animals. Increases in total aerobes, anaerobes, streptococci, and bacteroides were not significant. The celiac and hepatic vagotomy operation (group 2) caused no change in the microflora. Three dogs from group 3 developed frequent mushy stools and had at least 10^6 aerobes/ml throughout their small intestines.

2076 GASTRIC PEPSIN SECRETION BY HYPOTHALAMO-PITUITARY-ADRENAL ACTIVATION DUE TO INTRAHYPOTHALAMIC IMPLANTATION OF ADRENALINE.

(E.) Nagamachi, Y. (Gunma Univ., Sch. Med., Maebashi, Japan). *Am. J. Dig. Dis.* 18(1):23-31, 1973.

Following implantation of a 100 μg dose of epinephrine into various parts of the hypothalamus an investigation of gastric secretory response was undertaken in 66 adult male Heidenhain pouch dogs. The secretion of gastric pepsin increased in animals with implants in the posterior hypothalamus and median eminence as it did in animals receiving an ACTH-depot (2.5 IU/kg). This response was blocked by pituitary stalk section and adrenalectomy. On the other hand, an i.v. injection of 100 μg/kg of epinephrine for control had no effect on gastric pepsin secretion but did produce a marked rise in blood glucose levels. Thus, it seems reasonable to assume that the locally implanted epinephrine stimulates the hypothalamus, particularly the posterior hypothalamus and/or median eminence, to release ACTH which is responsible for a typical increase in gastric pepsin secretion. This study has demonstrated the presence of a humoral mechanism in the hypothalamo-pituitary-adrenal system with regard to control of gastric pepsin secretion.

2077 THE EFFECT OF BILE ON THE GASTRIC SECRETORY RESPONSES OF VAGALLY DENERVATED CANINE FUNDIC POUCHES.

(E.) Aubrey, D. A.; Burns, G. P. (Dept. Surg., State Univ. New York, Buffalo). *Am. J. Dig. Dis.* 18(1):43-53, 1973.

The gastric secretory responses of 3 vagally denervated canine fundic pouches stimulated by a meat meal have been defined following preliminary exposure of the pouches to ox bile at various pH levels. Experiments were performed in 4 groups: (1) meat meal only, (2) meat meal after preliminary instillation of bile at pH 7 into the pouches, (3) meat meal after introduction of bile at pH 2 and, (4) meat meal after introduction of bile at pH 12. Generally, exposure of the pouches to bile caused reduced outputs of H^+ and increased outputs of Na^+ which were not associated with significant changes in secretory volumes or in Cl^- outputs. These changes were compatible with increased exchange-diffusion not associated with significant inhibition of acid secretion. The changes were most pronounced when the bile was administered at pH 2. These studies support the concept that biliary reflux is harmful to the stomach. Furthermore, they indicate that bile is more injurious to the gastric mucosa at low pH levels.

2078 DYNAMIC CHARACTERISTICS OF GASTRIN RELEASE.

(E.) Jackson, B. M.; Reeder, D. D.; Thompson, J. C. (Univ. Texas Med. Br., Galveston). *Am. J. Surg.* 123(2):137-142, 1972.

The release of endogenous gastrin has been studied in 3 groups of 5 adult mongrel dogs each. Acetylcholine (pH 1.6), instilled into the isolated antral pouch, caused an immediate release of gastrin into the antral vein which was accompanied by fundic acid secretion. After 30 min the plasma gastrin concentration rose from 139 pg/ml to 634 pg/ml. At pH 7.0 the plasma gastrin concentration rose to 1,271 pg/ml within 5 min. Subsequent acidification of the antrum suppressed the secretion of both gastrin and acid to basal levels. Acidification of acetylcholine only partially blocked its stimulatory effect on gastrin release. Acidification of the resting antrum decreased the secretion of background gastrin. In the absence of acid suppression, brief stimulation of the antrum produced an immediate elevation of the antral venous gastrin concentration which persisted for at least 8 hr.

2079 COMPARISON OF THE EFFECT OF SEVERAL GASTRIN-RELATED COMPOUNDS ON ACID SECRETION IN DOGS.

(E.) Gadacz, T. R.; Way, L. W. (Dept. Surg., Univ. California, San Francisco). *Am. J. Surg.* 123(2): 143-148, 1972.

A study was made of the stimulating effect on acid secretion in Heidenhain pouch dogs by cerulein, desulfated cerulein, the octapeptide of cholecystokinin, cholecystokinin (CCK), and pentagastrin. Pentagastrin and desulfated cerulein evoked similar maximal rates of secretion. Cerulein and octapeptide of CCK elicited similar dose-response curves, and the maximal secretory rates with these two peptides were less than 50% of that of pentagastrin. CCK failed to stimulate pouch secretion over a wide range of doses (from 0.125-20 U/kg-hr), when CCK (4U/kg-hr) was added to an infusion of cerulein. Acid secretion was inhibited. These findings are interpreted as follows: (1) sulfation of tyrosyl in position 7 from the C-terminus in peptides with the active center of gastrin is the essential feature which changes these compounds from full agonists to partial agonists for gastric secretion in dogs; (2) the difference between natural CCK and the synthetic octapeptide of CCK for acid secretion is probably due to an enterogastrone other than CCK or secretin in the CCK preparation.

2080 INHIBITION OF HISTAMINE-, PENTAGASTRIN-, AND INSULIN-STIMULATED CANINE GASTRIC SECRETION BY PURE "GASTRIC INHIBITORY POLYPEPTIDE".

(E.) Pederson, R. A.; Brown, J. C. (Dept. Physiol., Univ. British Columbia, Vancouver, Canada). *Gastroenterology* 62(3):393-400, 1972.

Gastric inhibitory polypeptide, isolated from a partially purified preparation of cholecystokinin-pancreozymin, has been used in doses of 0.25-4.0 µg/kg/hr, in studies on the inhibition of H^+ secretion from Bickel-type pouches and the innervated gastric remnant in 6 dogs. A dose of 4.0 µg/kg/hr produced 40% inhibition of H^+ secretion stimulated by histamine dihydrochloride from the Bickel-type pouches and 75% inhibition of pepsin output. The polypeptide produced 25% inhibition of H^+ secretion to pentagastrin stimulation at 0.25 µg/kg/hr, and a dose of 1.0 µg/kg/hr produced 75% inhibition of H^+ secretion. Pepsin outputs were also inhibited to similar extents. In response to insulin hypoglycemia, H^+ secretion from the gastric remnant was inhibited by 45% and pepsin output was inhibited by 35%. The ability of the polypeptide to inhibit histamine-stimulated H^+ secretion suggests that this polypeptide could be the enterogastrone released when fat is instilled into the duodenum. However, such a claim to hormonal status must await identification of the polypeptide in blood

2081 PEPSIN SECRETION DURING DAMAGE BY ETHANOL AND SALICYLIC ACID. *(E.)*

Johnson, L. R. (Univ. Oklahoma Med. Ctr., Oklahoma City). *Gastroenterology* 62(3):412-416, 1972.

Pepsin output was measured in effluent from the Heidenhain pouches of 4 dogs during irrigation with 15% ethanol with or without HCl and during irrigation with 20 mN salicylic acid. Ethanol by itself damaged the pouches, as evidenced by large net fluxes of Na^+ and K^+ into the pouch and the appearance of protein in the fluid. Pepsin secretion, however, was not stimulated. The combination of ethanol and 100 mN HCl produced the same effect on Na^+, K^+, and protein and also increased pepsin secretion 6- or 7-fold. Small amounts of HCl (10 mN) in combination with ethanol also increased pepsin secretion 2- or 3-fold. HCl by itself caused a significant stimulation of pepsin secretion. Salicylic acid plus 100 mN HCl caused severe damage, as evidenced by bleeding and increased pepsin output from 3 mg/15 min during control periods to 26 mg/15 min. Pepsin secretion remained higher than control levels during the periods after removal of salicylic acid from the 100 mN HCl solution, indicating that H^+ was still moving across the damaged barrier. It is concluded that: (1) damage alone does not stimulate pepsin secretion, acid must be present; (2) pepsin secretion during damage is independent of the appearance of total protein in the irrigation fluid; (3) small amounts of acid are effective stimulators of pepsin secretion in the presence of a damaged barrier; and (4) damage by ethanol and salicylic acid in the presence of H^+ results in a significant stimulation of pepsin secretion.

2082 EFFECTS OF ATROPINE ON ACID SECRETION BY ISOLATED FROG GASTRIC MUCOSA. *(E.)*

Thorpe, C. D.; Durbin, R. P. (Univ. California Sch. Med., San Francisco). *Gastroenterology* 62(6):1153-1158, 1972.

Inhibition of acid secretion by atropine was studied in isolated bullfrog (*Rana catesbiana*) gastric mucosa. Treatment with 10^{-7}M atropine for 90 min significantly inhibited acetylcholine-stimulated secretion. This dose was of the same order of magnitude as that required in the *in vivo* dog. Inhibition was competitive in nature. Secretion stimulated by gastrin, pentagastrin, or histamine was much less sensitive to inhibition by atropine. High concentrations (1 mM or more) of atropine were required to inhibit the mucosal response to histamine. Concentrations greater than 1 mM (up to 4 mM) were required to inhibit gastrin- and pentagastrin-stimulated responses. Basal cholinergic stimulation, normally serving to potentiate the secretory response to gastrin or histamine, appears to be absent in this preparation.

2083 EFFECT OF GLUCAGON ON HISTAMINE- AND PENTAGASTRIN-STIMULATED CANINE GASTRIC ACID SECRETION AND MUCOSAL BLOOD FLOW. *(E.)*

Wilson, D. E.; Ginsberg, B.; Levine, R. A.; Washington, A. (Brooklyn-Cumberland Med. Ctr., N.Y.). *Gastroenterology* 63(1):45-50, 1972.

The effect of glucagon given i.v. on histamine- and pentagastrin-stimulated gastric secretion, was studied in 10 conscious dogs with Heidenhain pouches. The possible role of gastric microcirculation in mediating the glucagon effect was assessed with the aminopyrine clearance technique. During maximal or submaximal histamine stimulation, glucagon in 20-80 µg/kg dosages, failed to affect gastric secretion significantly. Pentagastrin-stimulated secretion was decreased as much as 90% by glucagon doses of 1-80 µg/kg. The inhibitory effect lasted for 40 min, with maximum inhibition occurring 10-30 min after injection. In addition, the pH was increased from 2.56 to 3.31 during the period of volume and acid inhibition. A concomitant decrease in mucosal blood flow was always seen. However, by determining the change in the ratio of blood flow to secretory rate, the reduction in mucosal blood flow was found to be secondary to a fall in secretion. During gastric secretory inhibition by glucagon a 41%

decline in aminopyrine clearance occurred; at maximum inhibition the decrease was 66%. These studies indicate that glucagon inhibits pentagastrin-stimulated secretion and that inhibition is not due to restriction of mucosal blood flow.

2084 PLASMA GASTRIN AND GASTRIC ACID RESPONSES TO SHAM FEEDING AND FEEDING IN DOGS.

(E.) Nilsson, G.; Simon, J.; Yalow, R. S.; Berson, S. A. (VA Hosp., Bronx, N.Y.). *Gastroenterology* 63(1):51-59, 1972.

Gastric acid secretion and plasma gastrin concentrations were determined during fasting and after sham feeding or feeding in 4 dogs with Pavlov pouches or gastric fistulae. Sham feeding caused increases in plasma gastrin concentrations within 2 min. Gastrin levels reached a maximum at 6-10 min, began to fall at 10-18 min, and rapidly returned to basal levels following the onset of acid secretion, although acid was continuously secreted for 3 hr. Sham feeding with the gastric fistula open produced higher gastrin concentrations and acid output than with the fistula closed. The increased gastrin levels remained at a high level for the 3 hr duration of the experiment. Feeding raised the plasma gastrin concentrations considerably higher than sham feeding in the same dogs, although the peak acid output equaled that after sham feeding with gastric fistula open. The delay in onset of acid secretion was more pronounced during feeding than during sham feeding. Atropinization did not significantly influence basal plasma gastrin concentration but virtually abolished the gastrin response to sham feeding, thus indicating that sham feeding causes gastrin release principally through a cholinergic mechanism. Plasma gastrin responses were observed after feeding despite atropinization.

2085 EFFECT OF ANTRAL DENERVATION ON GASTRIN RELEASE BY SHAM FEEDING AND INSULIN HYPOGLYCEMIA IN DOGS.

(E.) Tepperman, B. L.; Walsh, J. H.; Preshaw, R. M. (Dept. Physiol., Univ. Toronto, Canada). *Gastroenterology* 63(6):973-980, 1972.

Sham feeding increased peripheral venous plasma gastrin, as measured by immunoassay, in 5 dogs with innervated antral pouches, denervated fundic pouches, and gastric fistulae. The increase in plasma gastrin, and in output of acid and pepsin from the main stomach, was proportional to the duration of sham feeding. Similar increases in plasma gastrin, and in acid and pepsin output from the main stomach were prouduced by insulin hypoglycemia or perfusion of antral pouch with solutions of acetylcholine chloride (10^{-1} or 10^{-2}M). Denervation of the antral pouch had no effect on resting plasma levels of gastrin, but markedly reduced the basal acid and pepsin outputs from the main stomach: antral denervation abolished the plasma gastrin response to sham feeding and insulin hypoglycemia, but only reduced the acid and pepsin response to these stimuli from the main stomach. The plasma gastrin response to antral perfusion with acetylcholine solutions was slightly reduced by denervation of the antrum. The acid and pepsin responses from the denervated fundic pouch to sham feeding and insulin hypoglycemia could not be distinguished from those in control experiments without stimulation, before or after denervation of the antral pouch. These findings show that the relation between gastric acid and pepsin output and increase in plasma gastrin during vagal activation is not straightforward. Apparently vagal activation has a complex effect on gastric secretory glands.

2086 CALCIUM-INDUCED GASTRIC HYPERSECRETION: LACK OF EFFECT OF ENDOGENOUS PARATHYROID HORMONE.

(E.) Kaplan, E. L.; Hill, B. J.; Canterbury, J. M.; Reiss, E.; Peskin, G. W. (Dept. Surg., Univ. Chicago, Ill.). *J. Surg. Res.* 12(4):229-233, 1972.

The discrete effects of serum calcium and endogenous parathyroid hormone (PTH) secretion upon gastric acidity were studied in 6 patients with primary and 6 patients with secondary hyperparathyroidism and in 6 others with upper gastrointestinal pathology: active duodenal ulceration (3); pyloric obstruction (1); gastritis (2). There was no correlation between PTH and basal acid secretion. An increase in acid secretion from the stomach associated with calcium infusion occurred in patients in all 3 groups and was related to changes in serum calcium concentration but not to PTH. These studies suggest that in man, endogenous PTH has no direct stimulatory effect on gastric acid secretion but influences this indirectly by regulating calcium ion concentration.

2087 GASTRIC ACID SECRETION AFTER SMALL BOWEL RESECTION OR EXCLUSION IN DOGS: COMPARISON OF VAGALLY INNERVATED AND DENERVATED GASTRIC POUCHES.

(E.) Buxton, B.; Wasunna, A. E. O.; Saunders, J.; Gillespie, I. E. (Western Infirm., Glasgow, Scotland). *Rendic. Gastroenterol.* 4(2):81-86, 1972.

After intestinal resection, an increase in 24-hr acid secretion occurred in dogs with gastric pouches, but this increase was significantly less in 8 dogs with vagally innervated pouches than in 8 others with vagally denervated (Heidenhain) pouches. In addition, the acid response to a standard meal was greater in the 5th and 6th hr after the meal. The mean acid output for the 6 hr period was increased by 133%. This increase appeared less obvious in dogs with vagally innervated pouches. The acid response to graded doses of pentagastrin i.v. was substantially unchanged in both groups of dogs after intestinal resection. These studies indicate that prolongation of the acid response to a meal is responsible for the increase in gastric secretion after small bowel resection or exclusion and that the increase in gastric secretion after small bowel resection is relatively less in dogs with vagally innervated pouches.

2088 BILE AS A GASTRIC SECRETORY STIMULANT. *(E.)* Nahrwold, D. L. (Milton S. Hershey Med. Ctr., Hershey, Pa.). *Surgery* 71(2):157-160, 1972.

Acid secretion from 4 canine fundic pouches was monitored during perfusion of antral pouches with whole bile and with bile salts. Whole bile was shown to be a potent stimulus for release of gastrin. Human hepatic bile increased gastric output in 15 min; a plateau was reached after 90 min. Canine gallbladder bile increased gastric output in 15 min; a plateau was reached after 105 min. Acetylcholine chloride, buffered with glycine (pH 7), increased gastric output which peaked in 15 min. Sodium taurocholate and sodium glycocholate also increased gastric output.

2089 GASTRIC INHIBITORS OF INTESTINAL ORIGIN: COMPARISON OF THEIR INHIBITORY MECHANISM. *(E.)* Itoh, Z.; Lucien, H. W.; Schally, A. V. (Gunma Univ. Sch. Med., Maebashi, Japan). *Surgery* 71(6):849-856, 1972.

The inhibitory effects of 0.5 mg of purified enterogastrone, 75 clinical U of highly purified secretin, and 75 Ivy dog U of cholecystokinin (CCK) on gastrin- or histamine-stimulated gastric secretion were compared in 4 Heidenhain pouch dogs. Histamine (30 μg/kg/hr) or synthetic human gastrin I (3 μg per kg/hr) was continuously infused i.v. to stimulate gastric secretion. Gastric secretion was collected every 15 min for 4 hr. After the gastric secretion reached a plateau and remained at a constant level, a single i.v. injection of test material dissolved in 0.1 ml saline was made. Histamine-stimulated gastric secretion was inhibited by enterogastrone but was not inhibited by secretin or CCK, while gastrin-stimulated gastric secretion was inhibited by these duodenal hormones with the inhibitory effect of enterogastrone considerably stronger and more prolonged than that of secretin or CCK. From the results of these experiments, it is assumed that the site of action of gastrin is different from that of histamine, that enterogastrone inhibits gastric secretion by acting at the site where histamine acts, and that secretin and/or CCK stop gastric secretion by acting on the site stimulated by gastrin. Whether these duodenal hormones are involved in an inhibitory mechanism at the antral phase of gastric secretion is still unknown.

090 THE PRESENCE OF GASTRIN IN FASTING AND STIMULATED GASTRIC JUICE OF MAN. *E.)* Jordan, Jr., P. H.; Yip, B. S. S. C. (Baylor Coll. Med., Houston, Tex.). *Surgery* 72(3): 352-356, 1972.

Gastrin in gastric juice obtained from 10 patients, who had no gastric or duodenal disease, was measured by a radioimmunoassay technique. An immunoreactive material similar to gastrin was present in the basal gastric juice of all patients. The average concentration of gastric juice gastrin for 10 patients during the 2 hr control period ranged 53-584 pg/ml, and was greatly increased by the i.m. injection of betazole. In 4 patients the increase was less than 50%; in 5 patients it exceeded 100%. It is not known whether this material was intact gastrin or a degraded form. The increase in gastric juice gastrin was related to an increased volume of gastric juice as well as to an increased concentration of gastrin in gastric juice. The prolonged period that gastrin in gastric juice was elevated after betazole administration suggests this drug may stimulate the secretion of gastrin. It is not known whether the movement of gastrin into the gastric lumen occurs directly from the gastrin cells in the antrum or whether it results from clearance of gastrin from the blood by fundic mucosa.

2091 THE DISSOCIATION OF GASTRIC ACID OUTPUT AND PLASMA GASTRIN CONCENTRATION AFTER CALCIUM INFUSIONS IN CONSCIOUS MONKEYS. *(E.)* Rosato, E. F.; Mullen, J. L.; Lanciault, G.; Rosato, F. E.; Brooks, F. P. (Sch. Med. Univ. Pennsylvania, Philadelphia). *Surgery* 73(2):207-211, 1973.

Calcium infusion significantly increased plasma gastrin concentrations in 75 experiments performed on conscious male rhesus monkeys. A direct correlation was found between the increase in plasma gastrin and the increase in plasma calcium; acid response was variable. Although not statistically significant, an inverse correlation existed between plasma gastrin and acid output in 3 of the monkeys. These experiments demonstrate a reproducible rise in plasma gastrin in response to calcium stimulation. The dissociation between the gastric acid output and the plasma gastrin concentration demonstrates that the effect of calcium on acid secretion is not mediated primarily through increases in circulating gastrin.

2092 THE EFFECT OF DEPOT GLUCAGON ON GASTRIC SECRETION IN MAN. *(Ger.)* Ottenjann, R.; Rosch, W.; Deyhle, P. (German Clin. Diag., Wiesbaden). *Med. Klin.* 67(14):479-481, 1972.

2093 ANTI-GASTRIN ACTIVITIES OF 2-PHENYL-2-(2-PYRIDYL) THIOACETAMIDE (SC-15396) AND STRUCTURALLY RELATED COMPOUNDS IN EXPERIMENTAL ANIMALS. *(E.)* Lee, Y. H.; Phillips, E.; Sause, H. W. (Dept. Pharmacol., G.D. Searle & Co., Chicago, Ill.). *Arch. Int. Pharmacodyn. Ther.* 195(2):402-410, 1972.

2094 GASTRIC MUCOSAL STRIPPING IN THE DOG. *(E.)* Aagaard, P.; Andreassen, M.; Simonsen, J.; Olsen, J.; Funding, J.; Fernandez, A. (Rigshospital, Univ. Copenhagen, Denmark). *Scand. J. Gastroenterol.* 7(3):219-224, 1972.

2095 EFFECT OF TRINITROTOLUENE ON BASAL STOMACH FUNCTION IN DOGS SUBJECTED TO CHRONIC EXPERIMENTS. *(Rus.)* Kleiner, A. I. (Khar'kov Inst. Occupational Health Dis., USSR). *Farmakol. Toksikol.* 35(4):445-448, 1972.

2096 THE PHYSIOLOGY AND PATHOLOGICAL PHYSIOLOGY OF GASTRIC SECRETION. *(Ger.)* Miederer, S. E.; Stadelmann, O. (Med. Polyclin., Univ. Bonn, Germany). *Med. Klin.* 66(47):1587-1593, 1971.

2097 THE EFFECT OF GLUCAGON ON GASTRIC SECRETION STIMULATED BY CHOLECYSTOKININ AND INHIBITED BY SECRETIN. *(Ger.)* Ottenjann, R.; Deyhle, P.; Miederer, S. E. (Med. Clin., Univ. Erlangen-Nurnberg, Erlangen, Germany). *Med. Klin.* 66(47):1594-1597, 1971.

2098 EFFECT OF ORALLY ADMINISTERED PROSTAGLANDIN E_2 AND ITS 15-METHYL ANALOGUES ON GASTRIC SECRETION. *(E.)* Karim, S. M. M.; Carter, D. C.; Bhana, D.; Adaikan, G. P. (Makerere Univ. Med. Sch., Kampala, Uganda). *Br. Med. J.* 1(5846):143-146, 1973.

2099 THE STIMULATING ACTION OF GASTRIN PENTAPEPTIDE, HISTAMINE AND CYCLIC ADENOSINE 3',5'-MONOPHOSPHATE ON CARBONIC ANHYDRASE IN RAT STOMACH. *(E.)* Salganik, R. I.; Argutinskaya, S. V.; Bersimbaev, R. I. (Inst. Cytol. Genetics, Novosibirsk, USSR). *Experientia* 28(10):1190-1191, 1972.

2100 THE CHRONIC EFFECTS OF NICOTINE MONOMETHIODIDE ON GASTRIC SECRETION IN PYLORUS-LIGATED RATS. *(E.)* Thompson, J. H.; Angulo, M.; Choi, L.; Roch, M.; Jenden, D. J. (Univ. California Sch. Med., Los Angeles). *Experentia* 28(10):1176-1177, 1972.

2101 D- AND L-ISOMERS OF SERINE AND ALANINE EQUALLY EFFECTIVE AS RELEASERS OF GASTRIN. *(E.)* Csendes, A.; Grossman, M. I. (VA Ctr., Los Angeles, Calif.). *Experientia* 28(11):1306-1307, 1972.

2102 QUANTITATIVE AGAR GEL ELECTROPHORESIS OF HUMAN GASTRIC PROTEINASE PROENZYMES. *(E.)* Marakami, K.; Turner, M. D. (Univ. Rochester Sch. Med. Dent., N.Y.). *Anal. Biochem.* 50(2):409-415, 1972.

2103 THE GASTRIC MUCOSAL BARRIER. *(E.)* Davenport, H. W. (Dept. Physiol., Univ. Michigan, Ann Arbor). *Digestion* 5(3/4):162-165, 1972.

2104 EFFECT OF SECRETIN AND PENTAGASTRIN ON GASTRIC SECRETION IN MAN. *(E.)* Berstad, A.; Petersen, H.; Myren, J. (Ulleval Hosp., Oslo, Norway). *Acta Hepatogastroenterol.* 19:277-281, 1972.

2105 CONTROL OF GASTRIC ACID SECRETION IN CHICKENS. *(E.)* Sewing, K. F.; Ruoff, H. J. (Dept. Pharmacol., Univ. Tubingen, Germany). *Acta Hepatogastroenterol.* 19(4):296-300, 1972.

2106 THE EFFECT OF TRICYCLIC ANTIDEPRESSANTS (IMIZIN, DESIPRAMINE, AMITRIPTYLINE, AND AZAPHEN) ON GASTRIC SECRETION IN RATS. *(Rus.)* Andreeva, N. I. (S. Ordzhonikidze All-Union Sci. Res. Inst. Pharm. Chem., Moscow, USSR). *Farmakol. Toksikol.* 35(4):443-445, 1972.

2107 INHIBITION OF GASTRIC JUICE SECRETION IN CHICKENS BY ATROPINE, INSULIN, AND 2-DEOXY-D-GLUCOSE. *(Ger.)* Ruoff, H. J.; Sewing, K. F. (Pharmacol. Inst., Univ. Tubingen, Germany). *Naunyn Schmiedebergs Arch. Pharmakol.* 273(3):219-229, 1972.

See also 1972, 1974, 2071, 2111, 2118, 2157, 2207, 2210, 2400, 2420, 2438, 2491, 2687.

SECRETION AND METABOLISM

Pancreas

2108 THE PRESENCE OF A HCO_3^--ATPase IN PANCREATIC TISSUE. *(E.)* Simon, B.; Kinne, R.; Sachs, G. (Univ. Alabama Med. Ctr., Birmingham). *Biochim. Biophys. Acta* 282:293-300, 1972.

An ATPase was isolated from dog or cat pancreatic tissue and partially purified. The dog enzyme was stimulated 3- and 5-fold (particulate and soluble forms, resp.) by HCO_3^- and $HSeO_3^-$. It was completely inhibited by SCN^- and CNO^-. Inhibitors having no effect were: 2,4-dinitrophenol (1 mM), valinomycin (1 μM), nigericin (1 μM), and diamox (0.1 mM). SH reagents, such as 3,6-bio-acetomercurimethyldioxane or *p*-chloromercuribenzoate, inhibited the enzyme about 50% at 1 mM. In many of its properties, this ATPase resembles gastric ATPase.

2109 EFFECTS OF PHENOBARBITAL AND ETHIONINE ON HEPATIC AND PANCREATIC FUNCTIONS OF PROTEIN DEPRIVED RATS. *(E.)* Lee, N. H.; Kim, H. K.; Hong, S. S. (Yonsei Univ., Coll. Med., Seoul, Korea). *Arch. Int. Pharmacodyn. Ther.* 196(1):70-82, 1972.

The effects of chronic administration of ethionine and phenobarbital on biliary-pancreatic secretion and on secobarbital anesthesia were studied in 50 male albino rats fed a protein-free diet. The mortality in the protein-deficient group was 6%. Administration of ethionine (100 mg/kg/day i.p. for 3 weeks) increased this figure to 44%. In animals pretreated with phenobarbital (PB; 50 mg/kg/day i.p. for 4 days) and given either a protein-free diet with or without ethionine the anesthetic dose of secobarbital was twice that of animals not pretreated with PB Also, in the former animals the liver weights and hepatic protein concentrations were significantly greater than in the latter. The volume of biliary-pancreatic secretion and total bilirubin output were elevated, whereas total cholate level was reduced by PB pretreatment. Amylase, lipase, and trypsin activities in the juice increased significantly; however, PB pretreatment had little effect on the enzyme activity in pancreatic tissue. Ethionine administration in rats fed a protein-free diet caused a marked reduction of the levels of amylase and lipase both in pancreatic juice and in the tissue. Trypsin activity in tissue was not significantly affected. Also, when ethionine was administered there was a significant reduction in protein concentration of liver. PB pretreatments of rats fed a protein-free diet, with or without ethionine administration, produced effects on biliary-pancreatic secretion and on the liver qualitatively similar to those observed in animals fed a normal laboratory diet. It may be concluded that the effect of PB on induction of microsomal enzymes and on the aspects of biliary-pancreatic function examined are not affected by long-term administration of ethionine.

2110 INFLUENCE OF ANTIDIURETIC HORMONE ON PANCREATIC EXOCRINE SECRETION IN MAN. *(E.)* Dyck, W. P. (Scott and White Mem. Hosp., Temple, Tex.). *Am. J. Dig. Dis.* 18(1):33-38, 1973.

The effect of antidiuretic hormone (vasopressin, 0.1 pressor U i.v.) on pancreatic exocrine secretion was examined in 5 healthy fasting subjects (20-35 yr) during continous i.v. infusion of secretin (3 clinical U/kg/hr). Antidiuretic hormone administration markedly depressed output and bicarbonate concentration in the stimulated gland and was accompanied by an increase in chloride concentration. Calcium, magnesium, and total protein concentrations increased significantly following administration of antidiuretic hormone. While 4 of 5 individuals demonstrated an increase in potassium concentration, the increase was not significant. No consistent changes occurred in sodium concentration, and pancreatic juice osmolality remained unchanged.

2111 ISOLATION OF A GASTROSECRETAGOGUE SUBSTANCE FROM HOG PANCREAS. *(E.)* Pointer, H.; Vatier, J.; Subrasquet, M.; Accary, J. P.; Bonfils, S. (Bichat Hosp., Paris, France). *Clin. Chim. Acta* 42(1):321-326, 1972.

A gastrosecretagogue fraction has been extracted from hog pancreas by a method successfully employed for isolating gastrosecretagogue substances from urine. This substance is a polypeptide and has a chromatographic behavior slightly different from gastrin I of the hog. Its biological activity is similar to that of gastrin. Its amino acid composition suggests the presence of a C-terminal tetrapeptide composed of tryptophan, methionine, aspartic acid, and phenylalanine. Serine, valine, isoleucine, and leucine are present in this substance but are not present in gastrin.

2112 COMPOSITION OF HUMAN PANCREATIC JUICE. IMMUNOENZYMOLOGICAL STUDY. *(Fr.)* Clemente, F.; de Caro, A.; Figarella, C. (Natl. Inst. Health Med. Res., Marseille, France). *Eur. J. Biochem.* 31(1):186-193, 1972.

The enzyme composition of human pancreatic juice has been studied by immunoelectrophoresis and gel diffusion using non-activated and activated juice. Antisera were prepared with activated and non-activated pancreatic juice and were absorbed by proteins in human serum. Immunoelectrophoresis was carried out at pH 8.6 and disc immunoelectrophoresis at pH 8.9 and 5.0. Gel-diffusion media contained benzamidine to prevent zymogen activation. Precipitation lines were characterized by activating the zymogens on plates with trypsin, and identifying the enzymes produced with specific synthetic substrates. Immunoelectrophoresis gave 15-20 antigenic constituents. Although disc immunoelectrophoresis gave slightly different results, they were consistent with the results of immunoelectrophoresis. The following active enzymes were identified and localized: α-amylase, lipase, and carboxyl ester hydrolase. Several zymogens were identified: 2 immunologically distinct trypsinogens, 1 procarboxypeptidase B, 2 immunologically identical forms of procarboxypeptidase A, and 2 proelastases with some common antigenic determinants. After activation, both proelastases showed weak but different degrees of chymotrypsin activity. Chymotrypsinogen was localized in 2 major anionic lines and 1 minor cationic line. It is possible that one anionic immune precipitate is a polymer. No chymotrypsin activity was associated with procarboxypeptidase A. Immunoelectrophoresis of activated pancreatic juice demonstrates electrophoretic and antigenic changes. Activation of one anionic trypsinogen gave rise to cationic trypsin, whereas after activation chymotrypsinogens and procarboxypeptidases A showed no important change.

2113 EFFECTS OF FASTING AND FEEDING ON THE PANCREAS. *(E.)* Webster, P. D.; Singh, M.; Tucker, P. C.; Black, O. (VA Hosp., Augusta, Ga.). *Gastroenterology* 62(4):600-605, 1972.

A study was made of changes in total protein, amylase, RNA, and water content of pancreas of 20 male albino Sprague-Dawley rats which were fed *ad libitum;* fasted 24, 48, 72, or 96 hr; or fasted 96 hr and refed for 4, 24, 48, or 72 hr. Protein synthesis was estimated by ^{14}C-L-phenylalanine incorporation into protein. With fasting, there were progressive decreases in total protein, amylase, RNA, and water content of 8-37%. Refeeding for 4 hr was associated with further decreases in total protein, amylase, and RNA. Refeeding for 24, 48, and 72 hr was associated with increases in values to the levels either equal to or greater than in the basal fed state. These studies point out the rather striking changes in constituents of the pancreas which occur with fasting and refeeding.

2114 MECHANISMS OF NICOTINE-INDUCED INHIBITION OF PANCREATIC SECRETION OF BICARBONATE IN THE DOG.

(E.) Konturek, S. J.; Dale, J.; Jacobson, E. D.; Johnson, L. R. (Univ. Oklahoma Med. Ctr., Oklahoma City). *Gastroenterology* 62(3):425-429, 1972.

The effect of nicotine upon pancreatic secretion of fluid and bicarbonate was studied in 3 conscious dogs prepared with pancreatic and gastric fistulas. Secretion was stimulated either by i.v. infusion of secretin (0.37-3.0 U/kg/hr) or by the endogenous release of secretin elicited by intraduodenal infusion of 0.1 N hydrochloric acid. Pancreatic secretion of bicarbonate was inhibited 75% at a secretin dose of 0.37 U/kg/hr and 15% at 3.0 U/kg/hr. Nicotine was administered i.v. or applied topically to the duodenal mucosa to inhibit pancreatic secretion. Infusion of nicotine i.v. inhibited pancreatic secretion stimulated by all doses of exogenous secretin and by endogenously released secretin. Intraduodenal nicotine inhibited pancreatic secretion stimulated by endogenously released secretin but not by i.v. secretin. The depression of exogenously stimulated pancreatic secretion by i.v. nicotine showed characteristics of competitive inhibition. Nicotine appears to inhibit pancreatic bicarbonate and water secretion by a direct action on that organ and also by decreasing the endogenous release of secretin from the duodenal mucosa. Nicotine did not have a significant effect on pancreatic protein output stimulated by either secretin or cholecystokinin.

2115 EFFECT OF DRUGS ON PANCREATIC AMYLASE SECRETION IN VITRO.

(E.) Singh, M.; Black, O.; Webster, P. D. (VA Hosp. Augusta, Ga.). *Gastroenterology* 63(3):449-457, 1972.

Pancreatic slices from Sprague-Dawley rats were incubated aerobically in tissue culture media containing different concentrations of antibiotics. Amylase secretion into media and tissue amylase contents were measured. Amylase secretion was higher in tissue from fed rats or rats fed and given bethanechol chloride than in fasted control animals. Minimal secretion and decreases in tissue amylase were observed under anaerobic incubation. Atropine did not change secretion but reduced tissue amylase content. Cyanide sharply reduced amylase secretion. Tetracycline, valinomycin, and amphotericin B decreased secretion without altering tissue amylase content. Lidocaine increased secretion without altering tissue amylase content. Streptomycin increased secretion and decreased tissue content. Puromycin and actinomycin D did not change secretion but significantly reduced amylase content. These studies show that selected drugs, known to alter membrane function, also alter secretion.

2116 FUNCTIONAL CHARACTERISTICS AND LYSOSOMAL INTEGRITY OF THE ISOLATED PERFUSED CAT PANCREAS.

(E.) Ferguson, W. W.; Glenn, T. M.; Lefer, A. M. (Univ. Virginia Sch. Med., Charlottesville). *J. Surg. Res.* 11(7):364-374, 1971.

Isolated cat pancreas perfused with a physiological salt solution plus low molecular-weight dextran functions satisfactorally for at least 2½ hr. Measurements of vascular resistance, arterial and venous pH, PO_2, and PCO_2, pancreatic juice volumes and trypsin concentrations, and studies of acinar cell ultrastructure offer evidence for stability and functional integrity of the preparation. Total specific β-glucuronidase activity of the unstimulated perfused pancreas was comparable to that seen in the intact cat pancreas. However, stimulation by pancreozymin, and secretin markedly decreased the total β-glucuronidase activity of the perfused pancreas. Pancreozymin also increased the release of β-glucuronidase from lysosomal suspensions of liver and pancreas. β-Glucuronidase activity rose in the pancreatic juice, duodenal secretion, perfusate, and the bathing medium of the hormonally-stimulated perfused pancreas concomitant with a decreased number of zymogen granules and lysosomes in the acinar cells. The data demonstrate that pancreozymin increases the fragility of pancreatic lysosomes liberating β-glucuronidase into the pancreatic duct, extracellular space, and intravascular compartment. Lysosomal enzymes released into the duct may have an auxiliary digestive function in the duodenum, and the increased extracellular lysosomal enzyme activity may play a role in the pathophysiology of pancreatitis or other pancreatic disease states in which the pancreatic lysosomes become compromised.

2117 DEMONSTRATION OF ACTIVITY OF GASTRIN IN MAMMALIAN PANCREAS.

(E.) Omole, A. A.; Amure, B. O.; Ezimokhai, M.; Ayandipo, A. (Dept. Physiol., Univ. Ibadan, Nigeria). *Nature* [*New Biol.*] 237(75):183-184, 1972.

The method of Blair *et al.* was used to extract fresh pancreas, heart, liver, kidney, and abdominal wall muscle from 9 adult rabbits and 10 dogs of both sexes. Crude extracts were assayed for secretagogue activity against synthetic human gastrin I (SHGI) as standard on perfused rat stomach by continuously recording acid secretion. Histamine activity of the extracts was determined on isolated guinea pig ileum, and blood glucose levels were determined before i.v. injection of saline solutions of the extracts into urethane-anesthetized rats and just before the peak of secretory response to pancreatic extract. Little (1 ng or less) or no histamine activity and no insulin activity was found in any of the extracts studied. Detectable increases in gastric acid secretion were obtained by injecting saline extract obtained from 20 mg of dried powder from the pancreas, but no response was obtained to injections of saline solutions of extracts from heart, liver, kidney, or muscle (20-200 mg powder) of either the rabbit or dog. These secretory responses were analogous to those obtained with gastrin: a short latent period (2-3 min) and accelerated duration of responses with recovery to pre-stimulation states within 30 min. Gastrin activity in rabbit and dog pancreatic extracts was equivalent to 350 pg SHGI and 50 pg SHGI/mg extract, resp., while the average extractable activity per pancreas was about 24.0 ng SHGI for rabbits and 20.5 ng SHGI for dogs.

2118 THE CRITICAL NATURE OF GASTRIN IN PANCREATIC EXOCRINE SECRETION IN DOGS. *(E.)* rahood, R. C.; Beesley, W. H.; Datta, P.; Yanagisawa, .; Eisenberg, M. M. (Mt. Sinai Hosp., Minneapolis, inn.). *Surgery* 72(1):42-52, 1972.

ifferential selective gastric and extragastric agotomy have been used to study the relative ontributions of direct vagal innervation of the ancreas through extragastric vagal fibers and he vagal release of gastrin from the gastric ntrum in vagally driven pancreatic exocrine secretion in 9 mongrel dogs. After selective astric vagotomy with preservation of parasym-athetic innervation to the pancreas but elimi-ation of vagal gastrin release, pancreatic xocrine enzyme output was 75% lower in response o vagal stimulation. Following selective extra-astric vagotomy with important vagal pancreatic ibers divided and with preservation of the vagal-ntral gastrin mechanism, pancreatic protein output was only 15% lower. These data strongly suggest the humoral system is critical and clearly dominant over parasympathetic innervation in the control of pancreatic function in dogs.

2119 EFFECT OF DIET ON PANCREATIC FUNCTION AND MORPHOLOGY. IX. ADAPTATION OF PANCREATIC ENZYME ACTIVITY TO AN INCREASE IN PARENTERALLY ADMINISTERED CARBOHYDRATES. *(Sl.)* Bucko, A.; Kopec, Z.; Kapeller, J.; Mikulajova, M. (Res. Inst. Hum. Nutr., Bratislava, Czechoslovakia). *Cesk. Gastroenterol. Vyz.* 26(4):158-162, 1972.

2120 STIMULATING ACTION OF BILE SALTS ON PANCREATIC EXOCRINE SECRETION IN MAN. *(Por.)* Mott, C. B.; Sarles, H.; Gullo, L.; Tiscornia, O. (Res. Unit. Dig. Dis., I.N.S.E.R.M., Marseille, France). *Arq. Gastroenterol.* 9(4):179-182, 1972.

2121 HISTOCHEMICAL DISTRIBUTION OF CARBONIC ANHYDRASE AFTER LIGATION OF THE PANCREATIC DUCT. *(E.)* Churg, A.; Richter, W. R. (Dept. Pathol., Univ. Chicago, Ill.). *Am. J. Pathol.* 68(1):23-30, 1972.

2122 ROLE OF THE AUTONOMIC NERVOUS SYSTEM IN REGULATING ENZYME-SECRETING ACTIVITY OF THE PANCREAS AND LIVER. *(Rus.)* Sokolova, A. G.; Semeniuk, L. A. (Dept. Physiol., Odessa Univ., USSR). *Vrach. Delo* (7):93-94, 1972.

2123 STIMULATION OF PANCREATIC ENZYME SECRETION BY ACUTE HYPERCALCEMIA. *(Ger.)* Goebell, H.; Steffen, C.; Baltzer, G.; Schlott, K. A.; Bode, C. (Med. Clin., Univ. Marburg, Germany). *Dtsch. Med. Wochenschr.* 97(8):300-301, 1972.

See also 2072.

SECRETION AND METABOLISM

Hepatobiliary Tract

124 AN EXPERIMENTAL EVALUATION OF PHOTOTHERAPY FOR HYPERBILIRUBINEMIA IN THE GUNN RAT. *E.)* Butcher, R. E.; Vorhees, C. V.; Kindt, C. W.; eenan, W. J. (Children's Hosp. Res. Fdn., Univ. incinnati, Ohio). *Am. J. Dis. Child.* 123:576-578, 972.

aundiced rats of the Gunn substrain were exposed to ight for 2 to 7 hr/day between the 3rd and 25th day f life. (Preliminary experiments with large doses f blue light (460 nm) for alternate 30 min treatment and no treatment (24 hr/day) produced 100% mortality). There was no significant difference in weight gain between treated and untreated groups as phototherapy progressed. The health of treated jaundiced rats was better than that of untreated rats as manifested by an increased survival rate, increased weight, and enhanced swimming ability. Compared to untreated jaundiced rats, treated rats showed no improvement in their performance on behavioral tests although increased vitality was observed.

2125 EFFECT OF TRUNCAL VAGOTOMY ON 2-DEOXY-D-GLUCOSE AND INSULIN CHOLERESIS. *(E.)*

Gourlay, S. J.; Jones, R. S. (Duke Univ. Med. Ctr., Durham, N.C.). *Ann. Surg.* 176(5):645-648, 1972.

The effect of truncal vagotomy on 2-deoxy-D-glucose (2-DG) and insulin choleresis was studied in 6 fasting female mongrel dogs subjected to cholecystectomy, ligation of the lesser pancreatic duct, and insertion of 2 cannulas (one in the duodenum opposite the opening of the common bile duct, the other in the stomach). Peak bile flow increased to twice the control value after i.v. infusion of 2-DG (200 mg/kg) or insulin (1U/kg) combined with 0.16 M NaCl and 0.5% sodium taurocholate. Vagotomy had no effect. Neither drug nor vagotomy affected bicarbonate concentration. Both choleretics significantly increased bicarbonate output; vagotomy abolished this response. The chloride concentration was significantly increased by both choleretics, vagotomy abolished 2-DG response and diminished the insulin-stimulated increase. Chloride output was increased by both choleretics; vagotomy diminished 2-DG response but had no effect on insulin response. Gastric secretion was increased by both choleretics; vagotomy abolished the gastric response to both of these agents.

2126 THE ACUTE HEPATOTOXIC ACTION OF ALCOHOL SOLUTIONS OF VARIOUS CONCENTRATIONS WHEN ADMINISTERED ORALLY AND INTRAPERITONEALLY.

(Ger.) Strubelt, O.; Siegers, C. P.; Breining, H. (Med. Acad., Lubeck, Germany). *Arch. Toxikol.* 29:129-141, 1972.

Male rats received a single dose of ethanol (4.8 g/kg) either by a stomach tube as a 10, 20, 40, or 60% (v/v) solution in distilled water, or by i.p. injection as a 10, 20, or 30% (v/v) solution in a saline. SGOT, SGPT, serum glutamate dehydrogenase, and blood alcohol levels were determined 4, 8, and 16 hr later. There was a negative correlation between the concentration of ethanol solutions administered p.o. or i.p. and blood levels of ethanol. Slight increments of serum transaminase activities occurred in 4 of 12 groups given ethanol p.o., but the activity of serum remained unchanged. Injection of ethanol i.p., however, produced large increases in serum transaminase and glutamate dehydrogenase activities. This increase was greatest after injection of the 30% solution and smallest after injection of the 10% solution, though the total dose of ethanol was the same. BSP clearance, however, was not impaired after i.p. injection of ethanol. Injection of the ethanol solutions i.p. led to peritoneal inflammation, the severity of which corresponded to the concentration of ethanol. Extensive necrosis of the liver occurred on the surface while the parenchyma underneath was free from damage detectable with a light microscope. The severe hepatotoxic action of ethanol injected i.p. is due to nonspecific local injury. Therefore, i.p. injection is not a suitable method for investigation of the specific hepatotoxic activity of ethanol.

2127 HETEROGENEITY OF ALCOHOL DEHYDROGENASE FROM HUMAN LIVER. *(E.)*

Pietruszko, R.; Theorell, H.; de Zalenski, C. (Dept. Biochem., Karolinska Inst., Stockholm, Sweden). *Arch Biochem. Biophys.* 153(1):279-293, 1972.

Human alcohol dehydrogenase in crude liver extracts separates on starch gel at pH 8.5 into 7 bands. Component isoenzymes from the 4 fastest-migrating bands were separated by chromatography on carboxymethyl cellulose. Six distinct isoenzymes were separated: 1A, 1B, 2, 3A, 3B, and 4. The number denotes band position on starch gel; the letters, distinct subunit composition. Bands 1 and 3 each consist of 2 distinct isoenzymes. Bands 2 and 4 are also believed to be heterogeneous. The differences among isoenzymes were established by dissociation and reconstitution, electrophoresis, kinetics, and fluorometry. Isoenzymes 1A and 1B can be distinguished from one another by fluorometry and kinetics but appear identical on electrophoresis before and after dissociation and reconstitution. Isoenzymes 3A and 3B can be distinguished by electrophoresis at pH 7.0 and also form different products after dissociation and reconstitution. While isoenzyme 3A appears structurally related to the isoenzyme(s) occupying band 2 on starch gel at pH 8.5, isoenzyme 3B is related to the isoenzyme(s) occupying position 1. All of the isolated isoenzymes have low activities with ethanol; the most active has about 30% of the activity of horse liver isoenzyme EE.

2128 CARBON TETRACHLORIDE INDUCED PROTECTION AGAINST CARBON TETRACHLORIDE TOXICITY.

(E.) Glende, Jr., E. A. (Sch. Med., Case Western Reserve Univ., Cleveland, Ohio). *Biochem. Pharmacol.* 21(12):1697-1702, 1972.

Intragastric administration to male Sprague-Dawley rats of a small non-lethal dose of carbon tetrachloride (25 µl CCl_4/100 g) produces a dramatic protective action against subsequently administered large and ordinarily lethal doses (400-500 µl CCl_4/100 g) of the same liver poison. Resistance to the lethal effect of carbon tetrachloride sets in by 12 hr and is fully developed by 24 hr. Protection lasts for 3-5 days after which it gradually subsides. Activity of liver microsomal aminopyrine demethylase and cytochrome P-450 concentration were followed throughout the course of development of the protection phenomenon. Immediately after administration of the small initial dose of carbon tetrachloride activity of aminopyrine demethylase and cytochrome P-450 concentration began to fall. At 24 hr, when protection was complete, the activity of this enzyme system was about one-fourth of control levels. The depression lasted for 4 days and was followed by gradual recovery. The exact parallelism between depression of liver microsomal mixed-function oxidase activity and resistance to the lethal effects of carbon tetrachloride affords strong evidence for the view that metabolism of carbon tetrachloride by the liver microsomal drug-metabolizing system is a necessary prerequisite for the toxicity of this liver poison.

129 EVIDENCE FOR CONVERSION OF BILIRUBIN TO DIHYDROXYL DERIVATIVES IN THE GUNN RAT.

.) Berry, C. S.; Zarembo, J. E.; Ostrow, J. D. Roy. Free Hosp. Med. Sch., London, England). *ochem. Biophys. Res. Commun.* 49(5):1366-1375, 972.

ree bilirubin derivatives, isolated from the bile the jaundiced Gunn rat, are chromatographically d spectrally identical with products generated photo-oxidation of bilirubin in chloroform. The re pigments exhibit the spectrochemical characeristics respectively of a rubin, rhodin, and rpurin tetrapyrrole chromophore. Their mass ectra are compatible with dihydroxyl derivatives bilirubin which could be formed by photodeadation processes involving singlet oxygen. Exetion of these products in Gunn rat bile in the rk, as well as during phototherapy, suggests at a bilirubin oxygenase(s) is involved in the ternate pathways of bilirubin metabolism in ese animals which are congenitally unable to njugate bilirubin.

30 BILIRUBIN SECRETION INTO THE BILE. I. EFFECT OF MEDIA ON BILIRUBIN SECRETION. ALYSIS OF CRITERIA FOR BILIRUBIN SECRETION.

(Cz.) rsova, A.; Heringova, A.; Jirsa, M. (Inst. Matern- Child Welfare, Prague, Czechoslovakia). *Cesk. stroenterol. Vyz.* 26(4):169-173, 1972.

10 min intervals bile was collected from cannulas serted into the common bile ducts of anesthetized le and female Wistar rats. After 38 min, 1.6 ml a solution containing 10 mg bilirubin in 0.05 M dium carbonate and 0.1 M NaCl were injected into e caudal vein over a 2 min period so that a maxim bilirubin concentration was rapidly reached in e liver. Then the remaining 2.4 ml of the above lution was infused continuously for 27 min. This s followed by i.v. infusion of a solution containg 10 mg bilirubin in 2 ml 0.05 M sodium carbonate which had been added 2 ml serum from normal males, npregnant females, healthy women 2 days after ving birth, or male rats, or 2 ml of a 4% human bumin solution. The total quantity of bilirubin fused was 20 mg in 8 ml solution. Bilirubin one and serum from normal males and females caused moderate increase in choleresis, and bilirubin one also produced a moderate increase in the T_m. t serum significantly inhibited bilirubin secreon and decreased the T_m. Serum from women in the erperium and 4% human albumin had no effect either bilirubin secretion or the T_m. Thus, these dia are considered the most suitable for investiting the effect of various serum constituents on lirubin secretion. The bilirubin concentration the bile, and not the T_m, is the most important iterion for evaluating the secretory capacity of e liver.

31 THE INFLUENCE OF PYRAZOLE ON ETHANOL-INDUCED CHANGES IN CARBOHYDRATE METABOLISM THE LIVER.

(E.) Estler, C. J. (Pharmacol. Inst., iv. Erlangen-Nurnberg, Erlangen, Germany). *Naunyn hmiedebergs Arch. Pharmakol.* 273(3):213-218, 1972.

The effect of pretreatment with 340 µg/g pyrazole i.p., an inhibitor of alcohol dehydrogenase, on the changes in the carbohydrate metabolism of the liver, as produced by 4 mg/g ethanol i.v., was investigated in male NMRI mice about 3 months old. Pyrazole alone caused a significant decrease of the hepatic glycogen and lactate contents 75 min after its administration but had no effect on dihydroxyacetone phosphate, glycerol-1-phosphate, and pyruvate. When pyrazole was given 15 min before ethanol injection, it completely prevented the ethanol-induced rise in the glycerol-1-phosphate content and in the glycerol-1-phosphate/dihydroxyacetone phosphate and lactate/pyruvate ratios and diminished the decrease in hepatic pyruvate and lactate contents. This suggests that these changes are mediated by shifts in the hepatic NADH/NAD ratio occurring during alcohol oxidation. The glycogen depleting effect of ethanol was not abolished by pyrazole showing that this effect is brought about, at least in part, by ethanol itself.

2132 TIME COURSE OF THE ACUTE ALCOHOLIC FATTY LIVER AND CONCOMITANT MITOCHONDRIAL FUNCTION IN FASTED RATS.

(E.) Higgins, E. S.; Friend, W. H. (Med. Coll. Virginia, Richmond). *Proc. Soc. Exp. Biol. Med.* 141(3):944-947, 1972.

Pyrazole, an inhibitor of liver alcohol dehydrogenase and ethanol metabolism, was used to distinguish between acute biochemical responses produced directly by alcohol and secondarily by its metabolic effects. Male albino rats were divided into 4 groups: controls, and animals treated with single injections of pyrazole (45 mg/100 g i.p.), ethanol (3 g/kg i.p.), and pyrazole + ethanol. Rats treated with pyrazole and alcohol were given 5% ethanol in their drinking water for 10 days before injection. Over the 40 hr period studied, accumulation of hepatic triglycerides was dependent upon initial uptake of fatty acids from adipose stores and continued oxidation of ethanol by the liver. The increased efficiency of mitochondrial function, as monitored by the magnitude of respiratory control ratios, followed a time course isochronous with the blood alcohol curve and was dependent upon *in situ* exposure of the organelle to the alcohol molecule, not its metabolic sequelae. These relatively short-term responses are not sustained in well nourished animals receiving ethanol chronically. It is obvious that disturbances in hepatic metabolism differ considerably in acute and chronic alcoholism.

2133 TAUROCHOLATE METABOLISM IN MAN.

(E.) Stahl, E.; Arnesjo, B. (Dept. Surg., Univ. Hosp., Lund, Sweden). *Scand. J. Gastroenterol.* 7 (6):559-566, 1972.

Healthy subjects (3 female, 10 male, aged 22-38 yr) with no disturbances of their enterohepatic circulation and no history of gastrointestinal disorders were studied to devise a method for quantitative determination of bile acid modifications. Tracer doses of ^{35}S-tauro-7-^{3}H-cholate were given to 9 subjects, and duodenal aspirates from the next 7 days were examined, each taken 30 min after a 300 ml test meal. Specific radioactivities of both isotopes were determined. An average taurocholate pool of 0.9 ± 0.3 g, an average half-life of 2.1 ± 1.0 days, and a daily synthesis of taurocholate of 0.32 ± 0.14 g were found. The difference between the fractional turnover rate constant for the bile acid nucleus radioactivity and the taurine radioactivity expresses the fractional deconjugation rate and was 10 ± 6%/day. The 7-α-dehydroxylation rate, expressed as the percentage of the total bile acid radioactivity present in the deoxycholate fractions, was 5.8 ± 2.4%/day. After p.o. administration of 10 µCi ^{35}S-taurine to 4 subjects, virtually no radioactivity was found in the taurine-conjugated bile salts. A glycine:taurine ratio of 1.5 ± 0.8, a trihydroxy:dihydroxy bile acid ratio of 1.0 ± 0.3, and a cholate:deoxycholate ratio of 2.0 ± 1.0 were found. The absence of any bile salt nucleus radioactivity in compounds other than conjugated of cholic and deoxycholic acid indicates that deoxycholate is the only metabolite which can circulate within the enterohepatic circulation. Thus, a measure of the percent of total bile acid radioactivity present in the tauro- and glyco-deoxycholate fractions after different time intervals will reflect the rate at which 7-α-dehydroxylation occurs. After deconjugation the taurine moiety is not reutilized by reconjugation processes in the liver. The fact that the molar ratios between various kinds of bile salts is relatively constant from one day to the next in each individual and in the entire group might be useful in screening disturbances in bile acid metabolism in some intestinal diseases.

2134 PRIMATE BILIARY PHYSIOLOGY VIII. THE EFFECT OF PHENOBARBITAL UPON BILE SALT SYNTHESIS AND POOL SIZE, BILIARY LIPID SECRETION, AND BILE COMPOSITION. *(E.)* Redinger, R. N.; Small, D. M. (Boston Univ. Sch. Med., Massachusetts). *J. Clin. Invest.* 52(1):161-172, 1973.

The effects of phenobarbital (PB) on bile flow, biliary lipid secretion, bile acid synthesis, and bile-acid pool size have been studied. Using an experimental preparation that allows controlled interruption of the enterohepatic circulation 5 mg/kg day of PB were administered via a duodenal fistula in 3 divided doses to healthy rhesus monkeys for 1-2 wk to achieve steady-state conditions. Three animals with an intact enterohepatic circulation and 3 with a total bile fistula were studied. Each animal served as its own control. Total bile flow and secretion of bile salt, phospholipid, and cholesterol were measured every 24 hr during steady-state conditions. Further, under conditions of an intact enterohepatic circulation bile-acid synthetic rate was measured in 3 animals and pool size estimated in 2 animals during both control and drug treatment periods. PB increased bile flow 30-50% in all animals. The increased bile flow resulted from both an increased "bile-salt independent fraction" and an increased bile-salt secretion rate. PB significantly increased bile salt and phospholipid secretion by about 30%, but cholesterol secretion was not significantly changed. Consequently, the ratio of cholesterol to bile salt and phospholipid was decreased. PB significantly enhanced the maximal rate of bile acid synthesis 25-30% in all 3 monkeys with total bile fistulas and also augmented bile acid synthesis and pool size in animals with intact enterohepatic circulations, despite the fact that the rates of bile salt returning to the liver in these animals would have inhibited bile acid synthesis in control animals. Thus, PB not only increases the maximal rate of bile acid synthesis, but also alters normal control mechanisms by which the bile salts returning to the liver inhibit bile salt synthesis. The PB-induced increase in bile salt synthesis and the absence of change in cholesterol secretion is consistent with the view that PB augments conversion of hepatic cholesterol to bile salt. The resulting decrease in relative bile cholesterol content may have therapeutic implications for cholesterol gallstone therapy.

2135 PERMEABLE JUNCTIONAL COMPLEXES: THE MOVEMENT OF LANTHANUM ACROSS RABBIT GALLBLADDER AND INTESTINE. *(E.)* Machen, T. E.; Erlij, D.; Wooding, F. B. P. (Agr. Res. Council Inst. Anim. Physiol., Babraham, Cambridge, England). *J. Cell Biol.* 54(2):302-312, 1972.

2136 CHOLESTEROL METABOLISM IN RABBITS WITH OLEIC ACID-INDUCED CHOLELITHIASIS. *(E.)* Kyd, P. A.; Bouchier, I. A. D. (Roy. Free Hosp., London, England). *Proc. Soc. Exp. Biol. Med.* 141(3):846-849, 1972.

2137 EFFECTS OF BILIARY OBSTRUCTION ON PULMONARY ULTRASTRUCTURE IN THE RAT. *(E.)* Popovic, N. A.; Mullane, J. F. (Walter Reed Army Med. Ctr., Washington, D.C.). *Am. J. Pathol.* 68(1):97-112, 1972.

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See also 1970, 1978, 1979, 1980, 2077, 2109, 2122, 2739, 2740, 2741, 2774, 2786, 2788, 2810, 2846.

SECRETION AND METABOLISM

Intestine

2201 PREPARATION AND CHARACTERIZATION OF THE LATERAL AND BASAL PLASMA MEMBRANES OF THE RAT INTESTINAL EPITHELIAL CELL. *(E.)* Douglas, A. P.; Kerley, R.; Isselbacher, K. J. (Roy. Victoria Infirm., Newcastle upon Tyne, England). *Biochem. J.* 128(5):1329-1338, 1972.

The isolation of a plasma-membrane fraction from the rat intestinal epithelial cell (which is distinct from the microvillus membrane of that cell) was achieved in 4 basic steps: (1) isolation of only intestinal epithelial cells from female Sprague-Dawley rats; (2) homogenization using N_2 cavitation with ethylenediamine tetraacetic acid added immediately afterward to prevent bivalent-cation-induced aggregates of membrane vehicles; (3) subcellular fractionation; and (4) separation and purification of plasma membranes. The isolated fraction contains about 0.2% of the sucrase activity in the original homogenate and negligible quantities of nuclear and mitochondrial membrane markers. It contains 12% of the total Na^+,K^+-dependent adenosine triphosphatase and 7% of the alkaline phosphatase, with significant increments in specific activity of these enzymes. Multiple membrane preparations were highly reproducible with respect to the specific activities of the markers studied. The small intestine of one rat yields material containing about 1.3 mg of protein. To determine 5'-nucleotidase in the small intestine, in the presence of large amounts of alkaline phosphatase, a modification of Belfields's method was used.

2202 DIFFERENT EFFECTS OF FREE AND CONJUGATED BILE ACIDS AND THEIR KETO DERIVATIVES ON (Na^+,K^+)-STIMULATED AND Mg^{2+}-ATPASE OF RAT INTESTINAL MUCOSA. *(E.)* Hepner, G. W.; Hofmann, A. F. (Mayo Clinic, Rochester, Minn.). *Biochim. Biophys. Acta* 291(1):237-245, 1973.

Rat intestinal Mg^{2+}-ATPase present in a semipurified brush border preparation or membrane fraction of a mucosal homogenate from male Sprague-Dawley rats was stimulated by the free dihydroxy bile acids, chenodeoxycholic acid and deoxycholic acid (up to 10 mM concentration); the keto derivatives of cholic acid, a trihydroxy bile acid, caused an even greater stimulation. The glycine or taurine N-conjugates of these dihydroxy bile acids inhibited Mg^{2+}- and (Na^+, K^+)-stimulated ATPase. Lauric and oleic acid (0.5 mM) stimulated Mg^{2+}-ATPase, but the glycine and taurine N-conjugates of lauric acid inhibited both Mg^{2+}- and (Na^+, K^+)-ATPases. Bile acids influenced the rate of phosphate release at a concentration below the critical micellar concentration. Effects of each agent were linearly related to both concentration and time; those inhibiting Mg^{2+}-ATPase were maximally effective at 5 mM, had little effect below 1 mM, and persisted during 60 min incubation. Stimulatory agents were maximally effective at levels above the critical micellar concentration and also were effective below the critical micellar concentration; their effect was linear from 5-60 min. The data suggest that activation of Mg^{2+}-ATPase by surface-active agents such as dihydroxy bile acids and fatty acids is related to their pK_a, since conjugates with a lower pK_a were inhibitory.

2203 INTESTINAL FISTULA OUTPUT IN REGULAR, ELEMENTAL, AND INTRAVENOUS ALIMENTATION. *(E.)* Wolfe, B. M.; Keltner, R. M.; Willman, V. L. (St. Louis Univ. Sch. Med., Mo.). *Am. J. Surg.* 124(6):803-806, 1972.

The output of experimental enterocutaneous fistulas of the terminal ileum, 20 cm proximal to the ileocecal valve, was studied in 15 adult mongrel dogs. The volume lost in dogs fed an elemental diet was 81% lower than the volume lost in dogs fed regular canned dog chow and 93% lower than that in 6 dogs fed i.v. The output of dogs receiving total i.v. alimentation was 37.7% less than animals receiving the elemental diet. The nutritional losses in general paralleled the volume losses, being greatest in the dogs fed regular diet, markedly reduced in dogs fed elemental diet, and further reduced in dogs receiving total i.v. alimentation. The animals on an elemental diet lost 71% less calories and i.v.-fed dogs lost 93% less calories than controls and 67% less than dogs fed an elemental diet.

2204 UNIMPAIRED RESPONSE OF RABBIT JEJUNUM TO CHOLERA TOXIN AFTER SELECTIVE DAMAGE TO VILLUS EPITHELIUM. *(E.)* Roggin, G. M.; Banwell, J. G.; Yardley, J. H.; Hendrix, T. R. (Johns Hopkins Univ. Sch. Med., Baltimore, Md.). *Gastroenterology* 63(6):981-989, 1972.

Controlled exposure of 32 acute *in vivo* jejunal loops in 16 rabbits to hypertonic sodium sulfate solution produced consistent morphological changes in the villus epithelium and inhibition of net glucose absorption. In 11 of 12 loops extensive histological injury was manifested by a shortening and cytoplasmic coagulation of epithelial cells over the crest of the villi and along their sides. The changes disappeared near the crypt opening. In most cases the villous epithelium remained a discrete layer. Pre-exposure of jejunal loops in this manner did not alter fluid secretion induced by subsequent exposure to cholera exotoxin. The results support the concept that cholera exotoxin-induced fluid secretion originates from the crypts of Lieberkuhn.

2205 DAILY RHYTHMIC CHANGES IN BRUSH BORDER ENZYMES OF THE SMALL INTESTINE AND KIDNEY IN RAT. *(E.)* Saito, M. (Inst. Protein Res., Osaka Univ., Japan). *Biochim. Biophys. Acta* 286(1):212-215, 1972.

2206 METABOLISM OF MYRICETIN AND RELATED COMPOUNDS IN THE RAT: METABOLITE FORMATION IN VIVO AND BY THE INTESTINAL MICROFLORA IN VITRO. *(E.)* Griffiths, L. A.; Smith, G. E. (Dept. Biochem., Univ. Birmingham, England). *Biochem. J.* 130(1): 141-151, 1972.

2207 GASTRIC JUICE NEUTRALIZATION IN THE DUODENUM. *(E.)* King, C. R.; Schloerb, P. R. (Univ. Kansas Med. Ctr., Kansas City). *Surg. Gynecol. Obstet.* 135(1):22-28, 1972.

2208 KETOGENESIS FROM BUTYRATE AND ACETATE BY THE CAECUM AND COLON OF RABBITS. *(E.)* Henning, S. J.; Hird, F. J. R. (Russell Grimwade Sch. Biochem., Univ. Melbourne, Parkville, Australia). *Biochem. J.* 130(3):785-790, 1972.

2209 PASTEUR EFFECT IN THE *IN VITRO* VASCULARLY PERFUSED RAT SMALL INTESTINE. *(E.)* Lamers, J. M. J.; Hulsmann, W. C. (Rotterdam Med. Sch., Netherlands). *Biochim. Biophys. Acta* 275(3): 491-495, 1972.

See also 1973, 1977, 1988, 1990, 2021, 2135, 2218, 2220.

GENERAL

2210 THE EFFECT OF ACUTE METABOLIC ACID-BASE CHANGES ON SECRETION OF GASTRIN AND PARATHYROID HORMONE. *(E.)* Kaplan, E. L.; Peskin, G. W.; Jaffe, B. M. (Pritzker Sch. Med., Univ. Chicago, Ill.). *Surgery* 72(1):53-59, 1972.

Production of acute metabolic acidosis in 6 non-pregnant sheep by administration of dilute hydrochloric acid (4.5-1.8 mEq/kg/hr i.v. for 75-90 min) or ammonium chloride (3.0-0.8 mEq/kg/hr i.v. for 90 min) resulted in no consistent changes in serum immunoassayable gastrin or parathyroid hormone (PTH) concentrations. Production of acute metabolic alkalosis in 6 other sheep by sodium bicarbonate infusions (4.8-7.2 mEq/kg/hr for 75-150 min) resulted in prompt elevation of both serum gastrin and PTH in each animal tested. The elevated PTH is secondary to a lowered serum Ca^{++} concentration which accompanies the alkalosis. The mechanism of gastrin release associated with metabolic alkalosis remains unknown. These experiments demonstrate that in sheep, systemic acid-base balance may be important, not only in the control of PTH, but also in the regulation of gastrin secretion.

2211 EFFECT OF VASOPRESSIN ON PANCREATIC BLOOD FLOW IN ACUTE HEMORRHAGIC PANCREATITIS. *(E.)* Pissiotis, C. A.; Condon, R. E.; Nyhus, L. M. (Abraham Lincoln Sch. Med., Chicago, Ill.) *Am. J. Surg.* 123(2):203-208, 1972.

Pancreatic blood flow was measured under basal conditions and after administration of vasopressin (4.5 U/kg i.v. over 6 hr) to normal adult dogs and dogs in which acute hemorrhagic pancreatitis had been induced by injection into the main pancreatic duct of a mixture of 6 ml blood, 40,000 U crystalline trypsin dissolved in 4 ml water, and 4 ml bile under a pressure of 140 mm Hg. This mixture had been incubated for 12 hr at 37 C prior to injection. Pancreatic blood flow and aortic blood pressure remained stable for the entire 6-hr observation period in controls. Administration of vasopressin to normal dogs caused a 35-45% decrease in pancreatic blood flow and an increase in aortic blood pressure. Pancreatic blood flow was reduced by 40-60% in dogs with acute hemorrhagic pancreatitis, and the aortic blood pressure decreased shortly after injection of enzyme-digested blood into the pancreatic duct and continued to decline, except for a slight rise 1 hr after induction of pancreatitis. In dogs with acute hemorrhagic pancreatitis, pancreatic blood flow remained the same or increased slightly when vasopressin was administered, but the blood pressure response was more variable. In most cases the blood pressure decreased slightly during the first 30 min and then fluctuated around control values for the remainder of the experiment.

2212 MEASUREMENT OF PORTAL AND TOTAL HEPATIC BLOOD FLOW BY THE INTESTINAL XENON TECHNIQUE. *(E.)* Schizgal, H. M.; Goldstein, M. S. (Roy. Victoria Hosp., Montreal, Canada). *Surgery* 72(1):83-90, 1972.

In 10 dogs, the total hepatic blood flow was controlled by interrupting the portal vein and connecting a roller pump in series. True portal flow was determined with an error of less than 1% by measuring the pump flow rate volumetrically. The portal flow was measured with the intestinal ^{133}Xe, injected as a bolus within the lumen of the small intestine, was almost identical to the true portal flow. In a 2nd group of 7 dogs total hepatic blood flow was measured with xenon and correlated with the flow obtained using indocyanine green. The correlation was poor, perhaps due to difficulty in measuring the arteriovenous difference of iodocyanine green across the liver. In a 3rd group of 7 animals, there was an excellent correlation between the total hepatic blood flow, as measured with intestinal xenon, and the total hepatic blood flow, calculated from the xenon washout curve. The mean total hepatic blood flow in a group of 15 anesthetized dogs compared favorably with values recorded in the literature. The experimental data support the intestinal xenon technique as an accurate method of measuring portal vein and total hepatic blood flow. This technique is independent of liver function and can be applied clinically.

2213 BLOOD FLOW TO THE LIVER AND SPLEEN DURING ENDOTOXIN SHOCK IN THE BABOON. *(E.)* Swan, K. G.; Reynolds, D. G. (Walter Reed Army Inst. Res., Washington, D.C.). *Surgery* 72(3):388-394, 1972.

The effects of a nearly lethal dose of *Escherichia coli* endotoxin upon splanchnic hemodynamics were studied in anesthetized adult olive baboons *(Papio anubis)* of both sexes to evaluate further the role of the splanchnic viscera in the pathogenesis of irreversible shock. An i.v. dose of endotoxin (21 mg/kg, mixed with saline to a concentration of 2.0 mg/ml and delivered over a 10 min period) that caused a marked and sustained fall in arterial blood pressure, from 122 to 67 mm Hg, and which was lethal within 48 hr to 87% of the animals studied caused no significant change in either hepatic arterial blood flow or central venous pressure over a 4 hr observation period. Splenic arterial flow showed an initial rise to 79 ml/min at 10 min. It then fell significantly to 24 ml/min, and the fall was sustained. These findings lend no support to the theories which view the splanchnic viscera as target organs of shock, either directly or indirectly permitting the escape of enterotoxins from the gut into the systemic circulation during hypotensive syndromes. A similar study was performed on 1 dog with 5.0 mg/kg i.v. *E. coli* endotoxin.

2214 SEGMENTAL VENOUS DRAINAGE OF THE CANINE PANCREAS. *(E.)* Kim, J. P.; Byrne, J. J. (Boston Univ. Med. Ctr., Mass.). *J. Surg. Res.* 11(11):559-562, 1971.

2215 AUTORADIOGRAPHIC STUDY OF THE MITOTIC CYCLE OF THE ACINAR EPITHELIUM OF THE SUBMANDIBULAR SALIVARY GLAND IN MICE. *(Rus.)* Babaeva, A. G.; Skatkov, M. E. (Inst. Med. Genetics, Moscow, USSR). *Biull. Eksp. Biol. Med.* 73(2):110-112, 1972.

2216 THE INCIDENCE OF VARIOUS TYPES OF COLON BACTERIA IN THE FECES OF SUBJECTS AT DIFFERENT AGES. *(It.)* Fischetti, M. (Sanarelli Inst. Hyg., Univ. Rome, Italy). *Nuovi Ann. Ig. Microbiol.* 22(6):397-414, 1971.

2217 EFFECT OF TETRACYCLINE AEROSOLS ON INTESTINAL MICROFLORA IN ALBINO RATS. *(Rus.)* Vil'shanskaia, F. L.; Kats, I. Z.; Shteinberg, G. B.; Pospelova, V. V.; Rakhimova, N. G. (Moscow Inst. Epidemiol. Microbiol., USSR). *Antibiotiki* 17(4):355-359, 1972.

2218 TECHNIQUE FOR ORTHOTOPIC TRANSPLANTATION OF THE SMALL INTESTINE IN THE SWINE. *(Fr.)* Kunlin, A.; Hay, J. M.; Fagniez, P. L.; Parc, R.; Steiner, P.; Clot, J. P.; Garnier, H. (C.N.R.Z., Jouy-en-Josas, France). *Ann. Chir.* 26(9/10):505-510, 1972.

2219 CIRCULATORY SYSTEM ARCHITECTURE OF THE ESOPHAGUS. *(Fr.)* Delmas, A.; Gonzalez, M. A. (no affil.). *Bull. Acad. Natl. Med. (Paris)* 155(24/25):621-627, 1971.

2220 PROBLEMS IN ABSORPTION AND IMMUNOSUPPRESSION AFTER ENTIRE INTESTINAL ALLOTRANSPLANTATION. *(E.)* Ruiz, J. O.; Uchida, H.; Schultz, L. S.; Lillehei, R. C. (Univ. Minnesota Med. Sch., Minneapolis). *Am. J. Surg.* 123(3):297-303, 1972.

2221 EXPERIMENTAL FECAL PERITONITIS. INFLUENCE OF BARIUM SULFATE OR WATER-SOLUBLE RADIOGRAPHIC CONTRAST MATERIAL ON SURVIVAL. *(E.)* Sisel, R. J.; Donovan, A. J.; Yellin, A. E. (Univ. Southern California Sch. Med., Los Angeles). *Arch. Surg.* 104(6):765-768, 1972.

2222 INTERACTION BETWEEN PORTAL VENOUS AND HEPATIC ARTERIAL BLOOD FLOW: AN EXPERIMENTAL STUDY IN THE DOG. *(E.)* Kock, N. G.; Hahnloser, P.; Roding, B.; Schenk, Jr., W. G. (Dept. Surg., State Univ. New York, Buffalo). *Surgery* 72(3):414-419, 1972.

2223 THE EFFECTS OF OCCLUSION CLAMPS ON THE INTESTINAL WALL: A COMPARATIVE STUDY. *(E.)* Spitz, L.; Berry, C. L. (Univ. Witwatersrand, Johannesburg, South Africa). *J. Pediatr. Surg.* 7(3):287-291, 1972.

2224 ON THE POSSIBLE RELATIONSHIP BETWEEN DIARRHOEA AND *o*-CHLOROBENZYLIDENE MALONONITRILE (CS). *(E.)* Ballantyne, B.; Beswick, F. W. (Chem. Defence Establishment, Porton Down, Salisbury, England). *Med. Sci. Law* 12(2):121-128, 1972.

2225 THE POST-NATAL DEVELOPMENT OF THE RAT SALIVARY GLANDS. *(E.)* Pospisilova-Zuzakova, V. (Med. Fac., Comenius Univ., Bratislava, Czechoslovakia). *Biologia (Bratislava)* 27(12):925-938, 1972.

2226 REGIONAL DISTRIBUTION OF FELINE ESOPHAGEAL BLOOD FLOW. *(E.)* Harell, G. S.; DeNardo, G. L.; Archibald, R. W. R.; Bradley, B. R.; Zboralske, F. F. (Stanford Univ. Sch. Med., Stanford, Calif.). *Gastroenterology* 63(4):627-633, 1972.

See also 2021.

2227 RECTOCOLONIC EXFOLIATIVE CYTOLOGY: A NEW APPROACH. *(E.)* Katz, S.; Sherlock, P.; Winawer, S. J. (Mem. Hosp. Cancer Allied Dis., New York). *Am. J. Dig. Dis.* 17(12):1109-1116, 1972.

An instrument employing saline lavage with simultaneous suction has been devised. This instrument can assist in (1) evaluating the bowel without the changes created by enemas, (2) maintaining optimal visualization free of obscuring debris or hemorrhage, and (3) obtaining material for cytologic examination from the visualized 25-cm length of rectosigmoid and more proximal bowel. Experience to date (152 examinations including 85 which were confirmed at laparotomy) reveals excellent correlation of histologic and cytologic diagnoses for strictures in which radiological and biopsy data are inconclusive. The conditions examined include adenocarcinoma, lymphosarcoma, penetrating prostate carcinoma, rectosigmoid strictures, sigmoid carcinoma, chronic ulcerative colitis, and carcinoma *in situ* in a colonic polyp. A high degree of accuracy (75%) has been demonstrated for sigmoid and left colon lesions. The technique is suitable for the general population as well as those with a higher risk of malignant degeneration (to facilitate the early diagnosis of cancer). Physician time and patient discomfort can be kept to a minimum, and the technique may be applicable as an office procedure.

2228 USE OF DYE-DILUTION TECHNIC TO DEMONSTRATE BILIARY CALCULI IN THE OPERATIVE CHOLANGIOGRAM. *(E.)* Hur, K. B.; Park, Y. O.; Rice, R.; Min, K. S. (Yonsei Univ. Coll. Med., Seoul, Korea). *Ann. Surg.* 176(5):663-668, 1972.

A dye-dilution technique for clearer delineation of the biliary tree and its contents by cholangiography has been used in 33 patients. A dilated common bile duct may be associated with dilation of the hepatic ducts and a marked increase in the capacity of the biliary ductal system. The usual and standard amount of dye injected into such an expanded system is inadequate to fill the whole tract. However, increasing the volume of dye injected results in an unsatisfactory visualization of the biliary calculi because of the dye radiopacity. To allow an adequate volume of dye solution to be injected, and at the same time to prevent loss of shadow details due to a high density of the dye, the dye was diluted by a factor related to the diameter of the common duct. A 25% solution of the dye in a total volume of 9.0 ml (the volume of a 1 cm wide common duct) gave the best contrast between the calculi radiolucency and the ductal radiopacity. The actual volume of solution injected is being studied. Further investigations are being carried out on factors affecting the success of operative cholangiography.

2229 COMPARATIVE EVALUATION OF WATER RECOVERY TEST AND FLUOROSCOPIC SCREENING IN POSITIONING A NASOGASTRIC TUBE DURING GASTRIC SECRETORY STUDIES. *(E.)* Findlay, J. M.; Prescott, R. J.; Sircus, W. (Western Gen. Hosp., Edinburgh, Scotland). *Br. Med. J.* 4(5838):458-461, 1972.

Acid secretion studies were carried out in 50 patients, none of whom had undergone gastric surgery; all had upper gastrointestinal disorders. Fluoroscopy or a modified water recovery test was used to position the nasogastric tube. For every patient each positioning procedure was used on 1 of 2 consecutive days, and acid output studies were performed, first without stimulation and then after stimulation with pentagastrin (0.6 μg/kg s.c.). The tests were assessed by 2 observers and accepted or rejected. Analysis revealed no significant differences between the acid studies, irrespective of the method used for positioning the nasogastric tube. Rejection rates by either procedure were not significantly different. Practical considerations favor the continued use of water recovery as a means of positioning the nasogastric tube for gastric secretion studies.

2230 THE HISTOLOGICAL DIAGNOSIS OF CHRONIC GASTRITIS IN FIBREOPTIC GASTROSCOPE BIOPSY SPECIMENS. *(E.)* Whitehead, R.; Truelove, S. C.; Gear, M. W. L. (Radcliffe Infirm., Oxford, England). *J. Clin. Pathol.* 25(1):1-11, 1972.

A classification system for chronic gastritis has been established on the basis of 2500 biopsy specimens obtained with the fibreoptic gastroscope from patients with a variety of stomach diseases and from normal controls. The 4 biopsy features considered are: (1) the mucosal type, (2) the severity of chronic gastritis, (3) the activity of gastritis, and (4) the presence and type of metaplasia. Mucosal types are categorized as pyloric, which can originate in any part of the stomach; body; cardiac, which is similar to the pyloric mucosa but is distinguished by the presence of one or more dilated or cystic glands with a thin epithelial wall; transitional, composed of both body and pyloric or cardiac types; and indeterminate due to severe gastritis with atrophy or metaplasia. The severity of gastritis is classified as superficial (inflammatory and reactive changes of the superficial epithelium, gastric pit region, and related lamina propria) or atrophic (changes affecting the gland layer). Tubular atrophy is the only satisfactory criterion for atrophic gastritis. In active gastritis polymorphs invade and degenerative changes occur in epithelial elements of the gastric mucosa, whereas in quiescent gastritis epithelial degenerative changes are slight and chronic inflammatory infiltration is minimal; this quiescent phase is best seen in mucosa exhibiting gastric atrophy. Metaplasia can be either intestinal, e.g. in a mucosa which is the site of atrophic gastritis and occasionally in the superficial epithelium and pits in superficial gastritis, or pseudopyloric, i.e. in atrophic gastritis only; there is evidence that the latter type of metaplasia is reversible. Use of this classification is advocated for studies of the etiology of chronic gastritis and its relation to age, dyspepsia, anemia, peptic ulcer, cancer, and autoimmune phenomena; specimens should be taken from several sites in the stomach.

2231 ENDOSCOPY AND RETROGRADE CHOLEDOCHOPANCREATOGRAPHY IN THE DIAGNOSIS OF THE JAUNDICED PATIENT.

(E.) Blumgart, L. H.; Cotton, P. B.; Burwood, R.; Lawrie, B.; Salmon, P.; Davies, G. T.; Beales, J. S. M.; Skirving, A.; Read, A. E. (Welsh Natl. Sch. Med., Cardiff, Wales). *Lancet* 2(7790):1269-1273, 1972.

Duodenoscopy, cannulation of the papilla of Vater, and retrograde choledochopancreatography have been attempted in 87 jaundiced patients (21-88 yr old) in whom the diagnosis remained in doubt after standard investigations. Duodenoscopy and/or endoscopic retrograde choledochopancreatography gave a definitive diagnosis in 66 (75%) patients and useful information in another 5 cases indicating probable pancreatic cancer. Diagnoses obtained by this technique included: gallstones (18), pancreatic cancer (9), bile duct cancer (7), postoperative stricture (4), sclerosing cholangitis (4), debris in a dilated duct (1), gallbladder carcinoma (1), gallbladder cystic-duct stone (1), gallbladder not filled (gallstones) (1), dilated duct (1), and normal ducts (15). Diagnoses established by endoscopy (biopsy positive) were: ampullary cancer (1), pancreatic cancer (2), and gastric cancer (1). A normal biliary ductal system, found in 15 patients, ruled out extrahepatic cholestasis and saved unnecessary laparotomy. Duodenoscopy and cannulation of the papilla of Vater were relatively free of complications and reduced the need for percutaneous transhepatic cholangiography. This technique offers an early definitive diagnosis in the jaundiced patient and is a welcome advance in a difficult clinical area.

2232 DIAGNOSIS OF STARCH PERITONITIS BY PARACENTESIS.

(E.) Warshaw, A. L. (Massachusetts Gen. Hosp., Boston). *Lancet* (7786): 1054-1056, 1972.

This report describes 9 suspected cases of starch peritonitis, a granulomatous reaction to surgical glove powder, in which diagnosis was supported by examination of ascitic fluid obtained by paracentesis. Ascitic fluid from these patients was abundant, sterile, and contained mononuclear leukocytes. Starch granules were demonstrated either by iodine staining or by polarized-light microscopy in 7 of 9 uncentrifuged specimens. Control specimens from 10 other postoperative patients contained smaller numbers of mononuclear leukocytes and no starch granules. None of the 9 patients with starch peritonitis was reexplored; in each case the peritoneal reaction subsided without complication and did not recur. Although a late postoperative infection must not be lightly dismissed, generally the symptom complex of starch peritonitis is consistent enough to be recognized easily and not confused with a complicating bacterial infection. Examination of ascitic fluid provides a rapid, simple method of confirming the diagnosis and avoiding unnecessary reoperation.

2233 VALUE OF ENDOSCOPIC CATHETERIZATION OF THE PAPILLA OF VATER IN PANCREATIC DISEASES.

(Fr.) Denoix, P. F.; Chavy, A.; Liguory, C. (Gustave Roussy Inst., Villejuif, France). *Chirurgie* 98(9):543-548, 1972.

A technique is described for endoscopic examination of the pancreatic duct by catheterization and visualization of the pancreas by retrograde injection of contrast medium into the pancreatic duct. This technique was successfully used in 32 of 40 patients. In 18 cases the pancreatic duct was selectively visualized; in 12, both the pancreatic duct and biliary tract were visualized; and in 2, only the biliary tract was visualized because of its separate opening. Failure was encountered in 8 cases: the papilla of Vater was not found (2), the papilla could not be catheterized (6), the papilla protruded and was hypertonic (1), the papilla was in a postbulbar location (1). Within 48 hr after catheterization, serum amylase values increased to 3 times the normal value in 19 of 32 cases in which the pancreatic duct was visualized, 2 cases in which the pancreatic duct was visualized, but clinical symptoms of pancreatitis were manifested in only 2 of the 19. No perforations occurred in this series. Biological and clinical symptoms of pancreatitis were alleviated within 5 days by medical treatment. Diagnoses established by this method included pancreatic cancer (2 patients), pseudocyst (2 patients), and uncomplicated pancreatitis without calcification (2 patients).

2234 INCREASED SPECIFICITY OF LIVER SCANNING WITH THE USE OF ^{67}GALLIUM CITRATE.

(E.) Lomas, F.; Dibos, P.; Wagner, Jr., H. N. (Johns Hopkins Med. Inst., Baltimore, Md.). *N. Engl. J. Med.* 286(25):1323-1329, 1972.

Patients (61) with focal defects on colloid liver scan and 2 with intrahepatic mass lesions were studied with ^{67}gallium citrate (3-5 mCi i.v.). Definite accumulation of the radionuclide was noted in the lesions of 23 of 30 patients with hepatic cancer (11 of 12 with hepatocellular carcinoma, 4 of 9 with metastatic adenocarcinoma, 2 with squamous-cell carcinoma, 2 with malignant melanoma, 2 with Hodgkin's disease, 1 with undifferentiated carcinoma, and 1 with hepatoblastoma). The tracer was poorly taken up by 5 metastatic adenocarcinomas and 1 malignant carcinoid. Four of 6 patients with liver abscess and 1 with cirrhosis also has appreciable accumulation of gallium in the liver lesions. Other patients (26) with benign conditions producing focal defects on the colloid liver scan did not have appreciable uptake of gallium. In most cases the technetium sulfur colloid image gave a better indication of the extent of the lesions, although the gallium gave a better image when a peripherally situated neoplasm or abscess displaced relatively little normal liver tisse. The gallium studies were helpful in the detection of hepatoma in patients with cirrhosis and in differentiating cancer and abscess from more benign causes of an abnormal liver scan. ^{67}Ga may also aid in distinguishing an anatomic variant of a normal liver from cancer or abscess.

2235 RADIOIMMUNOASSAY OF GASTRIN WITH ACTIVATED CHARCOAL. *(E.)* Schrumpf, E.; Sand, T. (Ulleval Univ. Hosp., Olso, Norway). *Scand. J. Gastroenterol.* 7(8):683-687, 1972.

A precision of 8.0-12.4% was achieved when activated charcoal was used in the radioimmunoassay of gastrin. Between assays a precision of 10.8% was found. The sensitivity was 1.5 pg/tube and the accuracy 94-104%. The mean values of serum gastrin were 62±32 pg/ml in 21 subjects without gastrointestinal disease, 62±24 pg/ml in 11 patients with duodenal ulcer, 114±78 pg/ml in 9 patients with gastric ulcer, and 630 to 2380 pg/ml in 3 patients with the Zollinger-Ellison syndrome.

2236 ARTERIOGRAPHY IN THE DIAGNOSIS OF HEPATOMEGALY. *(Fr.)* Bonnin, A.; Sahut d'Izarn, J. J.; Ledoux-Lebard, G. (no affil.). *Progr. Med.* 100(6):213-219, 1972.

2237 ERROR IN DETERMINING BASAL GASTRIC SECRETION. *(Ger.)* Stutzer, H.; Beger, H. G. (Westend Clin., Free Univ., Berlin, Germany). *Med. Klin.* 67(2):48-50, 1972.

2238 PUNCH BIOPSY IN THE DIAGNOSIS OF SOME ESOPHAGEAL DISEASES. *(Rus.)* Lukichev, P. M.; Kalina, V. O.; Nechaeva, T. I. (Moscow Sci. Res. Inst. Roentgenol. Radiol., USSR). *Grud. Khir.* 14(4):101-104, 1972.

2239 METHODS FOR STUDYING GASTRIC FUNCTION. I. EXAMINATION OF GASTRIC SECRETION. *(It.)* Dal Monte, P. R.; Sarti, F.; Toscano, S.; Fiore, E.; Monti, M. (Inst. Med. Pathol. II, Univ. Bologna, Italy). *G. Clin. Med.* 52(11):801-830, 1971.

2240 SIMPLE INDIRECT DETERMINATION OF HISTIDASE IN LIVER NEEDLE BIOPSIES. *(Ger.)* Schon, R. (Pediatr. Clin., Univ. Vienna, Austria). *Klin. Paediatr.* 184(4):293-294, 1972.

2241 RADIOLOGICAL DIAGNOSIS OF GASTRIC LYMPHOMA. *(Ger.)* Fuchs, H.; Heckhausen, H.; Hartwich, G.; Sturm, G.; von Fritsch, E. (Med. Clin., Univ. Erlangen-Nurnberg, Erlangen, Germany). *Med. Klin.* 67(34):1074-1079, 1972.

2242 EXPERIENCE IN A MEDIUM-SIZED HOSPITAL WITH GASTROSCOPY AND CONTROLLED BIOPSY. *(Ger.)* Schellhorn, W. (Dreieich Hosp., Langen, Hessen, Germany). *Med. Klin.* 67(34):1070-1073, 1972.

2243 EXAMINATION OF THE LIVER AND PANCREAS WITH CONTACT ECHOTOMOGRAPHY. *(Fr.)* Melki, G. (Hosp. Sick Children, Paris, France). *Ann. Radiol.* 15(7/8):567-579, 1972.

2244 HISTOCHEMICAL REACTIONS OF LIVER ENZYMES IN LIVER DISEASES. *(Cz.)* Petzold, H. (Clin. Intern. Med., Karl Marx Univ., Leipzig, Germany). *Cesk. Gastroenterol. Vyz.* 26(4):163-164, 1972.

2245 CLINICAL CHEMICAL METHOD FOR LABORATORY DIAGNOSIS OF PANCREATIC DISEASE. *(Ger.)* Berndt, W. (1st Med. Clin., Univ. Hamburg, Germany). *Med. Lab. (Stuttg.)* 25(8):177-187, 1972.

2246 SIGNIFICANCE OF BONE MARROW AND LIVER PUNCTURE BIOPSIES FOR MALIGNANT LYMPHOMAS. *(E.)* Guller, R.; Senn, H. J.; Nagel, G. A.; Gudat, F.; Gyr, K. (Ecology Ctr., Basel Univ. Clin., Switzerland). *Schweiz. Med. Wochenschr.* 102(10):317-323, 1972.

2247 FALACIOUS OR FALACIOUSLY PALPABLE LIVER MASS AND ITS SCINTI-SCANNING PATTERNS. *(E.)* Sharma, B. N.; Grover, K. S.; Mookerjee, G. C. (Med. Div., INHS ASVINI Colaba, Bombay, India). *J. Assoc. Phys. India* 20(6):429-435, 1972.

2248 ENZYME HISTOCHEMISTRY IN LIVER PATHOLOGY. *(E.)* Cavallero, C.; Turolla, E.; Carnevali, L.; Finardi, G.; Pedini, G. (Inst. Pathol. Anat. II, Univ. Rome, Italy). *Pathol. Eur.* 7(1):3-16, 1972.

2249 LIVER BIOPSY AND AUSTRALIA (SH) ANTIGEN DETERMINATION. *(Ger.)* Sorger, K.; Holle, G.; Blauarmel, O.; Franz, H. (Pathol. Inst., Karl Marx Univ., Leipzig, Germany). *Dtsch. Gesundheitsw.* 27(27):1287-1291, 1972.

2250 THE CLINICAL VALUE OF ENDOSCOPIC RETROGRADE PANCREATOCHOLANGIOGRAPHY. *(Ger.)* Deyhle, P.; Fumagalli, J.; Paez, C.; Jenny, S.; Preter, B.; Menny, M.; Ammann, R. (Canton Hosp., Zurich, Switzerland). *Dtsch. Med. Wochenschr.* 97(31):1139-1141, 1972.

2251 DETERMINATION OF THE RELATIVE PORTAL LIVER CIRCULATION WITH ^{133}Xe AFTER CANNULATION OF THE UMBILICAL VEIN. *(Ger.)* Kunzli, H. F.; Fridrich, R. (Burgerspital, Basel, Switzerland). *Dtsch. Med. Wochenschr.* 97(31):1159-1161, 1972.

2252 BLIND ASPIRATION BIOPSY OF THE GASTRIC MUCOSA. *(Ger.)* Ottenjann, R. (Neuperlach Munic. Hosp., Munich, Germany). *Dtsch. Med. Wochenschr.* 97(31):1164-1165, 1972.

2253 DIAGNOSTIC ACCURACY OF EARLY RADIOLOGY IN ACUTE GASTROINTESTINAL HAEMORRHAGE. *(E.)* Allan, R. N.; Dykes, P. W.; Toye, D. K. M. (Gen. Hosp., Birmingham, England). *Br. Med. J.* 4(5835):281-284, 1972.

2254 SINGLE BOLUS INJECTION OR SLOW INFUSIONS FOR INTRAVENOUS CHOLANGIOGRAPHY? MEASUREMENT OF IODIPAMIDE (BILIGRAFIN) EXCRETION USING A RHESUS MONKEY MODEL. *(E.)* Whitney, B.; Bell, G. D. (Hammersmith Hosp., London, England). *Br. J. Radiol.* 45(540):891-895, 1972.

2255 "BIG GASTRINS" IN THE ZOLLINGER-ELLISON SYNDROME. *(E.)* Rehfeld, J. F.; Stadil, F. (Bispebjerg Hosp., Copenhagen, Denmark). *Lancet* 2(7788):1200, 1972.

2256 PULMONARY ASPIRATION AFTER FIBRE-ENDOSCOPY OF THE UPPER GASTROINTESTINAL TRACT. *(E.)* Prout, B. J.; Metreweli, C. (Roy. Cornwall Hosp., Truro, England). *Br. Med. J.* 4(5835):269-271, 1972.

2257 CHOLECYSTOGRAPHIC DIAGNOSIS OF SOLITARY CYST OF THE LIVER. *(E.)* Anton, H. C. (Stobhill Hosp., Glasgow, Scotland). *Br. J. Radiol.* 45(530):146-147, 1972.

2258 QUANTITATIVE ANALYSIS OF GASTRIC JUICE AMONG PATIENTS IN A SURGICAL CLINIC. *(Ger.)* Templin, R.; Wolf, E.; Rosenbaum, K. D.; Petermann, J. (Surg. Clin., Ernst Moritz Arndt Univ., Greifswald, Germany). *Zentralbl. Chir.* 97(21):673-677, 1972.

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2302 INDICATION OF SELECTIVE HEPATIC ANGIOGRAPHY. *(E.)* Takashima, T.; Tada, S.; Shin, M. (Kanazawa Univ., Japan). *Am. J. Roentgenol.* 116(2): 375-381, 1972.

2303 THE USE OF INDOCYANINE GREEN TEST IN EVALUATING LIVER DAMAGE IN PATIENTS WITH BURNS. *(Pol.)* Roszkowski, S.; Zietkiewicz, W.; Kania, B. (Inst. Hematol., Warsaw, Poland). *Pol. Tyg. Lek.* 27(24):903-905, 1972.

2304 ROENTGENOLOGIC DIAGNOSIS OF THE GASTRO-INTESTINAL TRACT BY HARMONIZATION. *(Jap.)* Suzuki, S.; Tanaka, M.; Izumi, K.; Nagase, T.; Yoshioka, T.; Tanaka, Y.; Fujimaki, T.; Yamashita, H.; Nishiyama, K.; Ohshima, T.; Tanigawa, S. (Sch. Med., Keio Univ., Tokyo, Japan). *Nippon Acta Radiol.* 31(11):1211-1223, 1972.

2305 BASIC STUDIES OF SMALL INTESTINAL PHARMACO-RADIOGRAPHY. *(Jap.)* Itoh, R. (Nippon Univ. Med. Sch., Tokyo, Japan). *Nippon Acta Radiol.* 31(11):1159-1191, 1972.

2306 TRANSPARIETAL PUNCH BIOPSIES OF THE LIVER WITH A MENGHINI NEEDLE IN A DEPARTMENT OF GENERAL MEDICINE: ANALYSIS OF A SERIES OF 464 CONSECUTIVE EXAMINATIONS. *(Fr.)* Pequignot, H.; Guerre, J.; Cocheton, J. J.; Christoforov, B.; Louvel, A. (Cochin Hosp., Paris, France). *Sem. Hop. Paris* 47(40/41):2363-2368, 1971.

2307 ORAL GALACTOSE TOLERANCE TEST IN LIVER DISEASE: TECHNIQUE AND ANALYSIS OF THE RESULTS. *(Ger.)* Hennecke, A.; Konig, K. J.; Sudhof, H. (Robert Koch Hosp., Gehrden, Germany). *Dtsch. Med. Wochenschr.* 97(4):109-117, 1972.

2308 AIR EMBOLISM DURING PERITONEOSCOPY. *(E.)* McQuaide, J. R. (Livingstone Hosp., Port Elizabeth, Union South Africa). *S. Afr. Med. J.* 46(15):422-423, 1972.

2309 ANALYSIS OF ESOPHAGUS BEHAVIOR BY HIGH-SPEED PHOTOGRAPHY. *(Jap.)* Knoue, T. (Tokyo Univ. Sch. Med., Japan). *J. Otolaryngol. Jap.* 75(5):557-564, 1972.

2310 2-PYRIDONE EXCRETION AFTER NICOTINAMIDE LOADING AS A LIVER FUNCTION TEST. *(E.)* Kanagawa, H. (Kumamoto Univ. Med. Sch., Japan). *Kumamoto Med. J.* 25(1):12-19, 1972.

See also 2102, 2319, 2386, 2388, 2391, 2394, 2449, 2528, 2535, 2615, 2634, 2729, 2861, 2870.

GASTROINTESTINAL DISEASES

ESOPHAGUS

2311 RESPONSE OF THE INTERPOSED HUMAN COLONIC SEGMENT TO AN ACID CHALLENGE. *(E.)* Jones, E. L.; Skinner, D. B.; Demeester, T. R.; Elkins, R. C.; Zuidemia, G. D. (Johns Hopkins, Univ. Sch. Med., Baltimore, Md.). *Ann. Surg.* 177(1):75-78, 1973.

Esophageal resection and colonic interposition were performed on 9 patients for benign disease. The isoperistaltic left colon, extending from just below the aortic arch to the posterior wall of the stomach at the junction of its proximal and middle third, was used in all cases. Clinical evaluations with pH reflux testing, acid clearing, manometric, and cinefluoroscopic technics were performed 1-26 months postoperatively. Follow-ups made after 2 months to 2 yr showed that all patients are swallowing well after operation and 8 of the 9 are completely satisfied with the operative results. Patients ranged in age from 27-80 yr. Spontaneous colonic peristalsis occurred in 1/3 of the patients. Stimulation of the colonic segment with water, and particularly with acid, caused a reproducible colonic contraction, and was comparable to the type II colonic contraction described previously for the colon in normal position. The colonic response to an acid stimulus was the most consistent, occurring in all 9 patients. Because of this sensitivity to acid, it is proposed that the interposed colon acts as a protective barrier, and any acid which refluxes is either buffered immediately by alkaline colonic secretions or induces colonic peristalsis with eventual return of the acid into the stomach.

2312 EFFECT OF POSTERIOR GASTROPEXY ON GASTROESOPHAGEAL SPHINCTER PRESSURE AND SYMPTOMATIC REFLUX IN PATIENTS WITH HIATAL HERNIA. *(E.)* Csendes, A.; Larrain, A. (Hosp. Jose Joaquin Aguirre, Univ. Chile, Santiago). *Gastroenterology* 63(1): 19-24, 1972.

Resting gastroesophageal sphincter pressure was studied before and after hiatal hernia repair in 29 adult patients (16 female, 13 male; 21-74 yr old, mean age 49 yr). A high esophageal stricture, a lower esophagus lined with columnar epitheluim, and Barrett's syndrome were present in 7 of the patients. Clinical, radiological, and manometric studies were performed in each case. After posterior gastropexy, there was a significant improvement both clinically and radiologically. Reflux symptoms were no longer present in 93% of the cases. Mean resting gastroesophageal sphincter pressure increased from 3.5 to 12.5 mm Hg. Follow-up showed no radiological recurrence of hiatal hernia. Resting gastroesophageal sphincter pressure measurements were made 16 months after surgical repair and revealed no decrease in pressure when compared with the results obtained after 2 months.

2313 SPASM IN THE DIFFERENTIAL DIAGNOSIS OF GASTROESOPHAGEAL REFLUX. *(E.)* Bombeck, C. T.; Battle, W. S.; Nyhuss, L. M. (Abraham Lincoln Sch. Med., Univ. Illinois Med. Ctr., Chicago). *Arch. Surg.* 104(4):477-483, 1972.

Sixty-three patients with esophageal symptoms were examined and contrasted with a series of 25 normal controls. Preoperative and postoperative symptoms were useless as factors for distinguishing whether a patient had reflux or spasm or both due to a wide overlap of symptomatology. Surgery was performed on 22 patients. Healing of the lesion and relief of symptoms resulted in 10 with esophagitis alone. While healing occurred in all 6 patients with esophagitis and spasm, symptoms were relieved in only 2. Of 6 with spasm alone, only 1 experienced relief of symptoms.

2314 ESOPHAGEAL HIATUS HERNIA AND MENTAL RETARDATION: LIFE-THREATENING POSTOPERATIVE METABOLIC ACIDOSIS AND POTASSIUM DEFICIENCY LINKED WITH A NEW INBORN ERROR OF NITROGEN METABOLISM. *(E.)* Kluge, T.; Borresen, H. C.; Jellum, E.; Stokke, O.; Eldjarn, L.; Fretheim, B. (Rikshospital, Oslo, Norway). *Surgery* 71(1): 104-109, 1972.

A report is given of an 18-yr-old boy with a severely symptomatic hiatus hernia, mental retardation, and psychomotor disturbances. The hernia was corrected surgically for relief of esophagitis and prevention of stricture formation. The hiatus hernia and esophagitis were not a congenital defect since gastroesophageal symptoms were absent during the first 16 yr of life. An explanation may be the aggravating effects of severe, metabolically-induced vomiting upon incompetence of the cardiac sphincter. Postoperatively, the patient developed profound metabolic acidosis and potassium depletion. The condition was life-threatening and required only daily infusions of about 600 mEq of bicarbonate and 300 mEq of potassium. Subsequent metabolic studies revealed a new inborn error of metabolism, pyroglutamic aciduria, is the underlying cause of the pathophysiologic disturbances. In general, inborn metabolic errors with excretion of large amounts of an abnormal anion can be expected to produce potassium depletion. If the potassium deficiency is combined with acidosis, the recommended treatment is to supply $KHCO_3$ or potassium citrate. It is suggested that patients with hiatus hernia and mental retardation be screened for evidence of inborn errors of metabolism.

2315 ESOPHAGEAL REPLACEMENT WITH JEJUNUM FOR NONMALIGNANT LESIONS: 26 YEARS' EXPERIENCE. *(E.)* Dave, K. S.; Wooler, G. H.; Holden, M. P.; Bekassy, S. M.; Ionescu, M. I. (Gen. Infirm., Leeds, England). *Surgery* 72(3): 466-473, 1972.

In the past 26 years 81 patients (42 male, 39 female, aged 6 months-73 yr) have had esophageal replacement with jejunum for nonmalignant lesions. Lesions (some patients having more than 1) included hiatus hernia (62); duodenal ulcer (24); achalasia of cardia (5), scleroderma of esophagus (5); corrosive stricture of esophagus, (2); leiomyoma of esophagus (1); and esophageal reflux without demonstrable cause (3). Associated gastrointestinal diseases included multiple jejunal diverticula (1) and carcinoma of the pelvic colon (1). Previous operative procedures included hiatus hernia repair (10), peptic ulcer operations (12), Heller's cardiomyotomy (3), transgastric dilatation of cardia for achalasia (1), esophagogastrectomy (4), plastic operations on the esophagus (2), and cholecystectomy (4). An isolated jejunal loop was used in 18 patients, Roux loop in continuity with gastrojejunal anastomosis in 19, Roux loop with gastrojejunal anastomosis and a distal purse-string suture in 21, and Roux loop with gastric exclusion or resection in 23 patients. There were 8 deaths, due to surgical technical failures. During the following 26 yr, 5 patients developed restricture. There were 23 late deaths, none of them attributable to the use of jejunum. All the patients have had relief of dysphagia and upper gastrointestinal symptoms. It is concluded that esophageal substitution with jejunum is a satisfactory technique for use in patients of all age groups. The operative mortality and morbidity rates are acceptable. Swallowing is assisted by active peristaltic contractions of the jejunum, and postoperative dumping and diarrhea are minimal. The patients lead an almost normal life.

2316 REFLUX ESOPHAGITIS IN THE ELDERLY, WITH SPECIAL REFERENCE TO ANTACID THERAPY. *(E.)* McHardy, G.; Balart, L. (Louisiana State Univ. Med. Sch., New Orleans). *J. Am. Geriatr. Soc.* 20(7):293-304, 1972.

2317 STUDY OF GASTRIC ACID IN HIATUS HERNIA. *(Por.)* Jardim, M. F. (Gen. Polyclin., Rio de Janeiro, Brazil). *Bol. Gastroenterol.* 64(4):735-741, 1972.

2318 MASSES OF THE DISTAL ESOPHAGUS AND PROXIMAL STOMACH. *(E.)* Sullivan, M. A. (Ochsner Clin., New Orleans, La.). *South. Med. J.* 65(7):785-790, 1972.

2319 SPONTANEOUS RUPTURE OF THE ESOPHAGUS. *(E.)* Smith, J. L. (no affil.). *Northwest Med.* 71(7):515-518, 1972.

2320 PROBLEMS WHICH HIATUS HERNIAS IN ADULTS POSE TO THE PRACTIONER. *(Fr.)* Hillemand, B. (no affil.). *Ouest Med.* 25(14):1357-1365, 1972.

2321 BURNS OF THE ESOPHAGUS, STOMACH, DUODENUM, AND FIRST PART OF THE JEJUNUM CAUSED BY INGESTION OF HYDROCHLORIC ACID AND FOLLOWED BY COMPLETE ESOPHAGEAL STENOSIS. *(Pol.)* Jackiewicz, Z.; Renkielski, K.; Martinek, J. (Med. Acad., Gdansk, Poland). *Pol. Przegl. Chir.* 44(6):1023-1025, 1972.

2322 WHAT IS A NORMAL ESOPHAGOGASTRIC JUNCTION? *(E.)* Venkatachalam, B.; Da Costa, L. R.; Ip, S. K. L.; Beck, I. T. (Hotel Dieu, Kingston, Canada). *Gastroenterology* 62(4):521-527, 1972.

2323 THE ESOPHAGOGASTRIC (SCHATZKI) RING AND REFLUX ESOPHAGITIS. *(E.)* Eckardt, V.; Dagradi, A. E.; Stempien, S. J. (VA Hosp., Long Beach, Calif.). *Am. J. Gastroenterol.* 58(5):525-530, 1972.

2324 COURSE AND TREATMENT OF BENIGN ESOPHAGEAL STRICTURES. *(E.)* Burkhart, K. L.; Sullivan, Jr., B. H. (Cleveland Clin., Ohio). *Am. J. Gastroenterol.* 58(5):531-536, 1972.

2325 PREOPERATIVE MANOMETRY IN THE CHOICE OF OPERATIONS FOR GASTROESOPHAGEAL REFLUX. *(E.)* Bombeck, C. T.; Battle, W. S.; Nyhus, L. M. (Abraham Lincoln Sch. Med., Univ. Illinois, Chicago). *Am. J. Surg.* 125(1):99-107, 1973.

2326 DYSFUNCTION OF THE ESOPHAGEAL INLET: TREATMENT BY UPPER ESOPHAGEAL SPHINCTER MYOTOMY. *(E.)* Nogueira, J. R.; Monsour, J. W.; Hermann, G. (Univ. Colorado Sch. Med., Denver). *Am. J. Surg.* 124(6):711-714, 1972.

2327 THE LOWER ESOPHAGEAL SPHINCTER. *(E.)* Cohen, S.; Harris, L. D. (Hosp. Univ. Pennsylvania, Philadelphia). *Gastroenterology* 63(6):1066-1073, 1972.

2328 BARIUM STUDIES FOLLOWING THE NISSEN-ROSSETTI OPERATION FOR OESOPHAGEAL STRICTURE DUE TO REFLUX. *(E.)* Gompels, B. M.; Harrison, G. K. (St. Thomas' Hosp., London, England). *Br. J. Radiol.* 45(530):137-141, 1972.

2329 CONGENITAL ENTERIC CYST OF THE ESOPHAGUS: A CASE REPORT AND REVIEW OF THE LITERATURE. *(E.)* Alfieri, O.; Kaminski, W.; Locatelli, G.; Vanini, V.; Parenzan, L. (Maggiore Hosp., Bergamo, Italy). *Ateneo Parmense* 42(6):779-788, 1971.

2330 THE SURGICAL MANAGEMENT OF LARYNGOTRACHEO-ESOPHAGEAL CLEFT WITH TRACHEOESOPHAGEAL FISTULA AND ESOPHAGEAL ATRESIA. *(E.)* Donahoe, P. K.; Hendren, W. H. (Massachusetts Gen. Hosp., Boston). *Surgery* 71(3):363-368, 1972.

2331 EXTREMELY RARE TYPES OF ESOPHAGEAL ATRESIA: TWO CASE REPORTS OF MEMBRANOUS ATRESIA AND MULTIPLE ATRESIA OF THE ESOPHAGUS. *(E.)* Matsumoto, Y.; Ogawa, K.; Yamamoto, T.; Kimura, K.; Kawai, Y. (Kobe Children's Hosp., Japan). *Surgery* 71(6):795-800, 1972.

2332 A CASE OF A LEFT ESOPHAGOCOLOPLASTY. *(Gr.)* Argianas, S.; Chrysospathis, P.; Stamatopoulos, K. (no affil.). *Acta Chir. Hellenica* 44(2):181-183, 1972.

2333 MEGAESOPHAGUS IN CHILDREN. *(Fr.)* Dailly, R.; Morin, C.; Roudil, C. (Charles Nicolle Hosp., Rouen, France). *Ann. Pediatr. (Paris)* 17(8/9):574-581, 1972.

2334 SYMPTOMATIC LOWER ESOPHAGEAL RINGS TREATED ENDOSCOPICALLY. *(E.)* Friedmann, E. (Peninsula Hosp., Burlingame, Calif.). *Calif. Med.* 116(5):61-65, 1972.

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See also 2219, 2238, 2256, 2264, 2271, 2281, 2309, 2369, 2375, 2432, 2503, 2633, 2832.

STOMACH

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2400 THE EFFECT OF X-IRRADIATION ON GASTRIC SECRETION IN THE INTACT GUINEA-PIG. *(E.)* Capoferro, R. (Rikshospital, Oslo, Norway). *Scand. J. Gastroenterol.* 7(7):599-602, 1972.

2401 THE EFFECT OF X-IRRADIATION ON THE PARIETAL CELL POPULATION IN THE INTACT GUINEA-PIG. *(E.)* Capoferro, R. (Rikshospital, Oslo, Norway). *Scand. J. Gastroenterol.* 7(7):603-607, 1972.

2402 A SOLITARY INTRACEREBRAL METASTASIS OF GASTRIC CANCER: REPORT OF A CASE. *(Jap.)* Mori, K.; Mori, K. (Kyoto Univ. Med. Sch., Japan). *Brain Nerve* 24(5):615-618, 1972.

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2404 TRICHOBEZOAR: AN UNUSUAL CAUSE OF MEGALOBLASTIC ANEMIA AND HYPOPROTEINEMIA IN CHILDHOOD. *(E.)* Bernstein, L. H.; Gutstein, S.;
IN CHILDHOOD. *(E.)* Bernstein, L. H.; Gutstein, S.;
Efron, G.; Wagle, A.; Graham, E. (Montefiore Hosp., Bronx, N.Y.). *Am. J. Dig. Dis.* 18(1):67-71, 1973.

2405 INTESTINAL METAPLASIA IN EXPERIMENTAL ATROPHIC GASTRITIS. SUCRASE ACTIVITY IN THE GASTRIC MUCOSA OF GUINEA-PIGS AFTER STOMACH IRRADIATION. *(E.)* Capoferro, R. (Rikshospital, Oslo, Norway). *Scand. J. Gastroenterol.* 7(8):711-712, 1972.

See also 2096, 2229, 2230, 2231, 2235, 2239, 2241, 2242, 2252, 2253, 2256, 2264, 2265, 2266, 2268, 2269, 2271, 2272, 2281, 2287, 2318, 2406, 2450, 2507, 2519, 2574, 2637, 2700, 2879, 2883, 2890.

Peptic Ulcers

2406 PENTAGASTRIN INFUSION-GLYCINE INSTILLATION AS A MEASURE OF ACID ABSORPTION IN THE HUMAN STOMACH: COMPARISON TO AN INSTILLED ACID LOAD.

(E.) Chapman, M. L.; Werther, J. W.; Rudick, J.; Janowitz, H. D. (Mt. Sinai Sch. Med., City Univ. New York). *Gastroenterology* 63(6): 962-972, 1972.

Acid absorption in the human stomach has been measured by (1) the instillation of glycine during maximal steady state stimulation to measure acid which might have been reabsorbed by the stomach, by subtracting from the maximal acid output the acid output without glycine instillation; (2) the absorption of acid after the instillation of isotonic HCl. The use of pentagastrin infusion under steady state maximal acid output has eliminated the difficulty caused when glycine stimulates gastrin release from the antrum with an augmentation of maximal secretion produced by histamine alone. Canine experiments with separated antrum validated this, indicating no increase in acid secretion from the corpus during pentagastrin infusion and glycine instillation into the antrum. Both pentagastrin infusion-glycine instillation and acid instillation studies were compared in 5 patients with gastric ulcer, 4 patients with duodenal ulcer, and 1 patient with gastric cancer. In addition, acid instillation studies alone were performed on 10 control subjects, 2 additional gastric ulcer patients, 4 duodenal ulcer patients, and 1 gastric cancer patient. In glycine-pentagastrin experiments gastric acid absorption in patients with gastric ulcer was 16.9 ± 2.6 mEq/hr and for acid instillation, 18.4 ± 2.0 mEq/hr. and for acid instillation, 18.4 ± 2.0 mEq/hr. These values do not differ significantly from each other and are higher than control values. Healing of gastric ulcer in 2 patients did not affect previously levels of acid absorption. For duodenal ulcer acid absorption was estimated at 4.1 mEq/hr by glycine and 5.4 ± 0.6 mEq/hr by acid instillation. Gastric cancer patients behaved similarly to control subjects for both methods. Increased permeability of the stomach to endogenous and exogenous H^+ ion in gastric ulcer and diminished permeability in duodenal ulcer have been observed with both techniques. These observations confirm the magnitude of H^+ absorption determined by acid instillation studies, and may indicate differences in size and barrier function of the antrum between gastric ulcer and duodenal ulcer.

2407 PENTAPEPTIDE AND INSULIN STIMULATED GASTRIC ACID SECRETION IN PATIENTS WITH DUODENAL ULCER BEFORE AND AFTER SELECTIVE GASTRIC VAGOTOMY AND ANTRUM DRAINAGE: A COMPARISON WITH RESULTS OBTAINED FROM STUDIES BEFORE AND AFTER PARIETAL CELL VAGOTOMY AND NO DRAINAGE PROCEDURE.

(E.) Kragelund, E.; Amdrup, E.; Jensen, H. E. (Munic. Hosp., Copenhagen, Denmark). *Ann. Surg.* 176(5):649-652, 1972.

Spontaneous gastric secretion and secretion following pentagastrin and insulin stimulation were studied in 30 patients (7 women, 23 men, aged 24-66 yr; average 51 yr) with duodenal ulcer before and 2-3 months after selective gastric vagotomy and antrum drainage. Postoperatively, fasting secretion volume fell by 48%, acidity by 90%, and total acid output by 93%. The pre- and postoperative secretion patterns following pentagastrin stimulation were similar. Maximal acid production occurred 15-30 min after stimulation, and decreased 66% after surgery. Insulin stimulated acid secretion was virtually eliminated. A comparison with the results of a similar secretion study made before and after parietal cell vagotomy without drainage showed no significant difference in any parameter of spontaneous or stimulated secretion between the two operative procedures. It is suggested that selective gastric vagotomy and antrum drainage be employed when there are clinical and radiologic indications of a stenosing ulcer, but in other cases parietal cell vagotomy without drainage is preferable.

2408 FACTORS INFLUENCING THE HEALING RATE OF CHRONIC GASTRIC ULCER.

(E.) Herrmann, R. P.; Piper, D. W. (Dept. Med., Univ. Sydney, Australia). *Am. J. Dig. Dis.* 18(1):1-6, 1973.

A retrospective survey was made of 99 patients with benign gastric ulcer admitted to hospital for medical treatment and 37 gastric ulcer patients who were treated first on an outpatient basis before being hospitalized and included with patients in the first group. Healing rate was measured every 21 days by use of profile surface area, obtained by air contrast radiography of the stomach. Ulcer size was found to be greater in those who smoked cigarettes (55 persons) or ingested salicylate-containing preparations (45 persons). Healing was accelerated by admission to hospital but was uninfluenced by age or sex of the patient, a positive family history of gastric ulcer (15 persons), duration of ulcer symptoms prior to admission, number of recurrences, therapy with frequent doses of potent antacids, or cessation of smoking (19 persons). At the extremes of ulcer size, large ulcers healed more slowly than small ulcers.

2409 QUALITATIVE AND QUANTITATIVE DIFFERENCES IN THE RESPONSE OF THE STOMACH TO PENTAPEPTIDE AND INSULIN SECRETORY STIMULATION AT 2-3 MONTH FOLLOW-UP AFTER PARIETAL CELL MASS VAGOTOMY.

(E.) Kragelund, E.; Amdrup, E.; Jensen, H. E. (Munic. Hosp., Copenhagen, Denmark). *Ann. Surg.* 176(5):656-658, 1972.

Spontaneous gastric acid secretion, and pentagastrin- and insulin-stimulated secretion in 30 patients (7 women and 23 men, aged 22-70 yr) with duodenal ulcers were studied before and after parietal cell vagotomy involving ligation of gastric arteries in the vicinity of the denervation dissection. The pattern of response after pentagastrin was qualitatively unchanged after operation. Maximal acid production occurred in the second 15-min period after stimulation and was reduced by 63% after surgery. Surgery reduced spontaneous acid secretion by 85%. Before operation, a 30 min period of secretion inhibition followed insulin administration. This inhibition period was extended after operation. Volume secretion response was lost, and the increase in activity was markedly reduced and delayed.

2410 SURGICAL MANAGEMENT OF PEPTIC ULCER DISEASE IN THE AGED PATIENT. *(E.)* Kaplan, M. S.; List, J. W.; Stemmer, E. A.; Connolly, J. E. (Long Beach VA Hosp., Calif.). *Arch. Surg.* 104(5):667-671, 1972.

Surgery for peptic ulcer was performed on 235 patients over 60 yr of age. Overall mortality was 16%. Mortality increased with age (7% in the 60-64 yr olds, 18% in 65-74 yr olds, 37.5% in those over 75 yr) (26% for gastric ulcer, 14% for duodenal ulcer), and with amount of preoperative bleeding, (7.5% in those receiving less than 3,000 ml blood before surgery, 26% in those receiving 3,000-5,000 ml and 35% for over 5,000 ml). Of the 235, 54% had a major coexisting systmeic disease; the mortality among these was 30% compared to the overall mortality of 16%. The mortality in those with no coexisting disease was 4%. The mortality for gastric ulcer was 26% and that for duodenal ulcer, 14%. The primary surgical precedure had little influence on mortality. Subtotal gastrectomy was more successful than vagotomy and drainage when reoperation was required. There was a high initial mortality with suture ligatures and a high recurrence rate with closure of perforation. The cause of death was recurrent hemorrhage or anastomotic leak in 24% of patients, cardiopulmonary failure in 44%, prolonged hypotension in 16%, failure in 44%, prolonged hypotension in 16%, stroke in 8%, and hepatic failure in 8%. Of 195 patients surviving operation, 75% were alive after 1 yr and 50% were alive 4 yr later. Only 10% of the subsequent deaths were related to ulcer disease.

2411 BILE SALTS PRODUCING STRESS ULCERS DURING EXPERIMENTAL SHOCK. *(E.)* Hamza, K. N.; DenBesten, L. (Univ. Hosp., Iowa City). *Surgery* 71(2):161-167, 1972.

The effect of bile salts on the frequency of stress ulcer formation in dogs maintained for 4.5 hr at a mean arterial pressure of 40-50 mm Hg has been studied . The animals were studied as follows: the pylorus was patent to allow duodenal reflux (Group I), the pylorus was occluded (Group II), the pylorus was occluded but 50 ml 15 mM taurocholic acid solution was instilled in the stomach (Group III), and the duodenum was occluded below the common bile duct, but above the pancreatic duct (Group IV). No gross ulcers or erosions developed in Group II. Five of 8 Group I animals, 8 of 9 animals II. Five of 8 Group I animals, 8 of 9 animals in Group III, and 5 of 8 Group IV animals showed multiple gross and microscopic ulcers or erosions. Ulcers were in varying stages of healing in surviving animals killed at 72 hr after operation. That bile salts have a significant etiologic relation to stress ulcer formation after shock is suggested by the absence of ulcers or erosions when duodenal reflux was prevented, and the associated high incidence with intragastric bile salts or a pylorus patent to allow reflux of duodenal chyme or bile alone.

2412 DIFFERENCES IN RATES OF GASTRIN RELEASE IN NORMAL PERSONS AND PATIENTS WITH DUODENAL-ULCER DISEASE. *(E.)* McGuigan, J. E.; Trudeau, W. L. (Univ. Florida Coll. Med., Gainesville). *N. Engl. J. Med.* 288(2):64-66, 1973.

Serum gastrin levels were measured in 22 patients (20 men, 2 women) with duodenal ulcer and 10 control subjects before ingestion of a protein-rich meal (180 g of beef) and during five 15-min intervals thereafter. The mean fasting serum gastrin concentration for the 22 patients with duodenal ulcer (76 ± 7.0 pg/ml) did not offer from that of the control subjects (71 ± 9.4 pg/ml). However, mean serum gastrin concentrations were significantly greater in patients with duodenal ulcer than in those of the control subjects 45, 60, and 75 min after feeding. The integrated gastrin response to feeding in these patients (99 ± 25%) substantially and significantly exceeded that of the control population (44 ± 10%). Thus, greater gastrin release occurs in response to feeding in such patients than in normal persons. Despite the absence of fasting hypergastrinemia, increased gastrin release shows the potential importance of gastrin in the hypersecretory state that frequently characterizes duodenal ulcer.

2413 MECHANISMS OF LOCAL VASODILATION WITH HYPERTONIC GLUCOSE IN THE JEJUNUM. *(E.)* Chou, C. C.; Burns, T. D.; Hsieh, C. P.; Dabney, J. M. (Dept. Physiol., Michigan State Univ., East Lansing). *Surgery* 71(3):380-387, 1972.

With the use of a double-segment preparation of the canine jejunum, this study inquired into some possible mechanisms for increased blood flow through the intestine in clinical or experimental dumping syndrome. Measurements were made of the effect on venous outflow, plasma osmolarity, glucose concentration, lumen volume, and pressure of (1) luminal placement of glucose and nonabsorbable polyethylene glycol solutions of various concentrations, ranging from 2.5-50% glucose and 85% polyethylene glycol, (2) intra-arterial infusions of glucose solutions, and (3) luminal placement of a 50% glucose solution before and after exposing the mucosa to dibucaine. Systemic blood pressure was not altered by the luminal placement or intra-arterial infusion of any solution. Placement of a hypertonic glucose solution into the jejunum increased the rate, osmolarity, and glucose concentration of the venous outflow and also increased lumen volume and pressure. The increased motility and flow is a local phenomenon, resulting from a decrease in local vascular resistance, apparently due to vasodilation, and is not mediated by hyperglycemia. In addition to a direct effect of hypertonicity on visceral and vascular smooth muscles, the increased flow and motility appear to be mediated by mechanisms that can be blocked by exposing the mucosa to a local anesthetic such as dibucaine.

2414 PENTAPEPTIDE AND INSULIN STIMULATED GASTRIC ACID SECRETION IN PATIENTS WITH GASTRIC ULCER BEFORE AND AFTER PRECISE ANTRECTOMY.

(E.) Kragelund, E.; Amdrup, E.; Andreassen, J.; Jensen, H. E. (Munic. Hosp., Copenhagen, Denmark). *Ann. Surg.* 176(5):659-662, 1972.

Spontaneous gastric secretion and secretion following pentagastrin and insulin stimulation were studied preoperatively in 17 patients (7 women, 10 men; 14 over 50 yr with gastric ulcers and between 2 and 3 months after precise antrectomy. Postoperative studies were made in 5 patients after 1 week. Peroperative pentagastrin studies were made before and immediately after the precise antrectomy in 4 patients. Spontaneous and pentagastrin stimulated acid secretion fell, postantrectomy, by approximately 85%. This was observed at 2 to 3 months after surgery but also after 1 week in an additional 5 patients; peroperative pH studies showed virtual elimination of pentagastrin stimulated acid secretion immediately after antrectomy. Postoperative fasting secretion volume was reduced by 32%, and the total acid output by 80%. Basal secretion volume was reduced by 23% and acidity by 80%. In practical terms, antrectomy eliminated the acid secretion response to insulin stimulation. In gastric ulcer patients, the antrum seems to be important for parietal cell response to both insulin and pentagastrin stimulation.

2415 RESPONSE TO DUODENAL ACIDIFICATION IN MAN. IV. EFFECT ON GASTRIC EMPTYING.

(E.) Wormsley, K. G. (Maryfield Hosp., Dundee, Scotland). *Scand. J. Gastroenterol.* 7(7):631-637, 1972.

An investigation was made of the patterns of gastric emptying of an acid load, or of saline during acid perfusion through the duodenum. In 13 healthy subjects and in 24 chronic duodenal ulcer patients (2 of whom had pyloric stenosis), 8 patients with chronic ulcer of the gastric corpus, 8 pernicious anemia patients, and 2 subjects with carcinoma of the pancreas and obstructive jaundice. Gastric emptying in patients with gastric ulcer was normal. Patients with duodenal ulcer showed either a reversal of the normal pattern with an increase in the rate of gastric emptying during duodenal acidification or, like patients with achlorhydria, accentuation of the normal slowing of gastric emptying by acid in the duodenum. The latter type of response may prove useful in predicting which patients with duodenal ulcer are likely to develop the clinical syndrome of pyloric stenosis.

2416 THE ROLE OF THE MICROBIAL FLORA IN ACUTE GASTRIC STRESS ULCERATION.

(E.) Nance, F. C.; Kaufman, H. J.; Batson, R. C. (Louisiana State Univ. Sch. Med., New Orleans). *Surgery* 72(1):68-73, 1972.

The role of the gastrointestinal flora in restraint-stress-induced gastric ulceration has been studied. Germ-free rats subjected to restraint stress had a marked reduction in the incidence and severity of gastric ulceration compared to similarly treated conventional or "conventionalized" animals. Nonabsorbable antibiotics (kanamycin and neomycin) given prior to restraint significantly reduced the incidence and severity of gastric ulceration in conventional animals. No conclusions could be drawn concerning polymyxin since 10 of 15 animals treated with it died. Neomycin had no effect on gastric ulceration in germ-free animals. Monoassociation of gnotobiotic rats with an endotoxin-producing strain of *Escherichia coli* resulted in a slight increase of the severity of gastric ulceration. Further conventionalization produced a marked increase in ulceration, which was partially reduced by p.o. administration of neomycin. Bacterial factors appear to play an important role in the pathogenesis of stress ulcers.

2417 TREATMENT OF PATIENTS WITH GASTRIC RESECTION.

(Nor.) Gjone, E. (Rikshospital, Oslo, Norway). *Tidsskr. Nor. Laegeforen.* 92(21/22): 1371-1375, 1972.

2418 GASTRIC ULCER TREATED WITH PYLORUS-SPARING GASTRIC RESECTION.

(Nor.) Roland, M.; Liavag, I. (Deaconess Hosp., Oslo, Norway). *Tidsskr. Nor. Laegeforen.* 92(21/22):1367-1371, 1972.

2419 SELECTIVE PROXIMAL VAGOTOMY IN THE TREATMENT OF DUODENAL ULCER.

(Nor.) Roland, M.; Liavag, I. (Deaconess Hosp., Oslo, Norway). *Tidsskr. Nor. Laegeforen* 92(21/22):1363-1366, 1972.

2420 EXPERIMENTAL STUDY OF THE EFFECTS OF ELECTRIC CURRENT ON GASTRIC HYDROCHLORIC ACID AND PEPSIN SECRETION AND TROPHISM IN RATS (SHAY'S PHARMACOLOGICAL MODEL).

(Sp.) Carrasco Salas, J. M.; Monfort Albelda, R.; Alemany Ontiveros, J. R.; Aznar Lopez, J. (Med. Dept., Catalonian Hydroelectric Co., Barcelona, Spain). *An. Med. Acad. Cien. Med. Cataluna* 58(2):136-146, 1972.

2421 TREATMENT OF PEPTIC ULCER WITH CARBENOXOLONE SODIUM (DOUBLE-BLIND TEST).

(Ger.) Hampel, K. E.; Billich, C.; Dannenmeier, H. D.; Fintelmann, V.; Fischer, R.; Schmid, E.; Treske, U.; Walz, A. (Med. Clin., Free Univ., Berlin, Germany). *Munchen. Med. Wochenschr.* 114(19):925-929, 1972.

2422 EFFECT OF ADRENERGIC RECEPTOR BLOCKING AGENTS ON THE DEVELOPMENT OF EXPERIMENTAL ULCER IN THE RAT.

(E.) Gati, T.; Keszler, P.; Zelles, T.; Pucsok, J. (Semmelweis Univ. Med. Sch., Budapest, Hungary). *Acta Physiol. Acad. Sci. Hung.* 30(3/4):393-396, 1971.

2423 THE ULCER DIATHESIS IN PERFORATED DUODENAL ULCER DISEASE: EXPERIENCE WITH 252 PATIENTS DURING A TWENTY-FIVE YEAR PERIOD. *(E.)* Jarrett, F.; Donaldson, G. A. (Massachusetts Gen. Hosp., Boston). *Am. J. Surg.* 123(4):406-410, 1972.

2424 RADICAL RESECTION OF THE DIFFICULT DUODENAL ULCER: AN ARGUMENT FOR PREFERENCE OF ANTRECTOMY OVER PYLOROPLASTY. *(E.)* Bakaloudis, P. T. (Evangelismos Med. Ctr., Athens, Greece). *Am. J. Surg.* 123(3):329-331, 1972.

2425 VAGOTOMY AND MUCOSAL ANTRECTOMY IN THE ELECTIVE TREATMENT OF DUODENAL ULCERS. *(E.)* Kirk, R. M.; Sussman, T. (Hampstead Gen. Hosp., London, England). *Am. J. Surg.* 123(3):323-328, 1972.

2426 ELECTIVE OPERATIONS FOR DUODENAL ULCER. *(E.)* Jordan, Jr., P. H. (Baylor Coll. Med., Houston, Tex.). *New Engl. J. Med.* 287(26): 1329-1337, 1972.

2427 CONVENTIONAL SURGERY FOR GASTRODUODENAL DISEASES WITH REGARD TO CURRENT KNOWLEDGE ON THE PHYSIOPATHOLOGY OF THE DUODENUM. *(It.)* Dacha, U. (S. Martino Munic. Hosp., Genoa, Italy). *Rass. Arch. Chir.* 9(6):346-351, 1971.

2428 EPIDEMIOLOGY OF PEPTIC ULCER IN AN URBAN COMMUNITY IN CHANDIGARH. *(E.)* Sehgal, A. K.; Chhuttani, P. N.; Gupta, B. B.; Malik, K.; Gupta, H. D. (Postgrad. Inst. Med. Educ. Res. Chandigarh, India). *Indian J. Med. Res.* 59(10): 1612-1620, 1971.

2429 EFFECT OF TESTOSTERONE AND MEPROBAMATE ON THE GASTRIC ACIDITY AND PEPTIC ULCERATION. *(E.)* Chandra, D.; Gupta, S. S.; Bhagwat, A. W. (Gandhi Med. Coll., Bhopal, India). *Indian J. Med. Res.* 59(4):609-613, 1971.

2430 EFFECT OF COMPLAN ON UNDERWEIGHT PATIENTS AFTER GASTRIC SURGERY. *(E.)* Goudie, J. H.; Samuel, P. D.; Cox, A. G. (Roy. Postgrad. Med. Sch., London, England). *Br. J. Clin. Pract.* 25(5): 212-213, 1972.

2431 CALCIUM METABOLISM AFTER GASTRECTOMY. I. CALCIUM BALANCE. *(Sl.)* Beno, I.; Chorvathova, V.; Bucko, A. (Res. Inst., Hum. Nutr., Bratislava, Czechoslovakia). *Cesk. Gastroenterol. Vyz.* 26(4):145-151, 1972.

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2433 COMPARATIVE STUDY OF THE ULCER-INDUCING ACTION OF VARIOUS ORALLY ADMINISTERED, NONSTEROID ANTIINFLAMMATORY AGENTS IN THE RAT. *(Fr.)* Baillet, J.; Ferrero, E.; Guzzon, V. (Res. Ctr., Midy Lab., Paris, France). *Therapie* 27:483-489, 1972.

2434 OUR EXPERIENCE WITH SULPIRIDE IN THE TREATMENT OF DUODENAL ULCER. *(Sp.)* Meeroff, M.; Segal, J. E.; Olivera, J.; Meeroff, J. C. (No affil.). *Galicia Clin.* 44(5):449-463, 1972.

2435 FREE PERITONEAL PERFORATION OF PEPTIC ULCERS. *(Fr.)* Richelme, H.; Boyer, R.; Bourgeon, A. (C.A.C. Diag. Treatment, Nice, France). *Ann. Chir.* 26(9/10):581-588, 1972.

2436 PEPTIC ULCER IN THE ELDERLY: CLINICAL AND RADIOLOGICAL ASPECTS. *(Ger.)* Hajdu, I.; Balogh, I.; Forgacs, S. (Janos Hosp., Budapest, Hungary). *Munchen. Med. Wochenschr.* 114(2):532-537, 1972.

2437 PITUITARY FUNCTION DISORDERS AND THEIR SIGNIFICANCE IN THE PATHOGENESIS OF PEPTIC ULCER. *(Rus.)* Mosin, V. I. (Stavropol Med. Inst., USSR). *Klin. Med. (Mosk.)* 49(9):119-123, 1971.

2438 IMPROVED TECHNOLOGY AND ENHANCED ACCOMPLISHMENT OF GASTRIC FREEZING: AN EXPERIMENTAL STUDY. *(E.)* Goodale, R. L.; Ghanem, M.; Borner, J. W.; Spanos, P. L.; Blackshear, P. L.; Wagensteen, O. H. (Health Sci. Ctr., Univ. Minnesota, Minneapolis). *Arch. Surg.* 104(3):314-318, 1972.

2439 THE INHIBITORY EFFECT OF SULPIRIDE ON PENTAGASTRIN-STIMULATED GASTRIC SECRETION. *(E.)* Aune, S.; Stadaas, J. O. (Ulleval Hosp., Oslo, Norway). *Scand. J. Gastroenterol.* 7(8):713-715, 1972.

2440 THE EFFECT OF SULPIRIDE ON GASTIC MOTILITY. *(E.)* Stadaas, J. O.; Aune, S. (Ulleval Hosp., Oslo, Norway). *Scand. J. Gastroenterol.* 7(8):717-721, 1972.

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2442 STUDIES ON THE PATHOGENESIS OF "STRESS ULCER": EFFECT OF HEMORRHAGE, TRANSFUSION, AND VAGOTOMY IN THE RESTRAINED RAT. *(E.)* Ritchie, Jr., W. P.; Roth, R. R.; Fischer, R. P. (Walter Reed Army Med. Ctr., Washington, D.C.). *Surgery* 71(3):445-451, 1972.

2443 ADDITIONAL EXPERIENCE WITH ELIMINATION OF ROUTINE NASOGASTRIC SUCTION FOLLOWING GASTRIC OPERATIONS. *(E.)* Herrington, Jr., J. L. (Dept. Surg., Vanderbilt Univ. Med. Ctr., Nashville, Tenn.). *Surgery* 71(1):132-135, 1972.

2444 TESTING ADEQUACY OF VAGOTOMY AT OPERATION. *(E.)* Coupland, G. A. E.; Cumberland, V. H. (Roy. North Shore Hosp., Sydney, Australia). *Ann. Surg.* 176(5):641-644, 1972.

2445 PENTAPEPTIDE AND INSULIN STIMULATED GASTRIC ACID SECRETION IN PATIENTS WITH GASTRIC AND DUODENAL ULCER. *(E.)* Jensen, H. E.; Kragelung, E.; Amdrup, E. (Kommunehospital, Copenhagen, Denmark). *Ann. Surg.* 176(5):653-655, 1972.

2446 ACUTE GASTROINTESTINAL ULCERATION WITH OPEN-HEART SURGERY AND AORTIC VALUE DISEASE. *(E.)* Katz, S. E.; Kornfeld, D. S.; Harris, P. D.; Yeoh, C. B. (Coll. Physicians Surg., Columbia Univ., New York, N.Y.). *Surgery* 72(3):438-442, 1972.

2447 EFFECT OF POSTURE ON GLUCOSE TOLERANCE AFTER GASTRIC SURGERY. *(E.)* Holdsworth, C. D.; Hulme-Moir, I.; Thirumalai, C. (Roy. Infirm., Sheffield, England). *Br. Med. J.* 4(5834):198-200, 1972.

2448 SIMPLER SURGERY IN THE TREATMENT OF POST-GASTRECTOMY MALNUTRITION. *(E.)* Nelson, A. R. (no affil.). *Am. J. Surg.* 124(6):750-753, 1972.

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2451 HIGHLY SELECTIVE VAGOTOMY WITHOUT DRAINAGE IN THE TREATMENT OF DUODENAL ULCER. A PRELIMINARY REPORT. *(E.)* Heffernan, S. J.; Lane, D.; McMullin, J. P.; Mehigan, J. A. (Mater Hosp., Dublin, Eire). *J. Irish Med. Assoc.* 65(12):307-311, 1972.

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2454 FACTORS INFLUENCING PROGNOSIS IN PERFORATED PEPTIC ULCER. *(E.)* McDonough, J. M.; Foster, J. H. (Hartford Hosp., Hartford, Conn.). *Am. J. Surg.* 123(4):411-416, 1972.

2455 CARBENOXOLONE SODIUM IN THE TREATMENT OF GASTRIC ULCER. *(Gr.)* Triandafillou, G. (no affil.). *Galenus* 18(6):771-780, 1971.

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2459 BLEEDING AS AN EARLY COMPLICATION OF GASTRECTOMY. *(Pol)* Drews, R.; Sniezynski, C. (Acad. Med., Poznan, Poland). *Pol. Przegl. Chir.* 44(6):1007-1011, 1972.

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2461 CLINICAL TRIAL OF METACLOPRAMIDE ON POSTVAGOTOMY GASTRIC STASIS. *(E.)* Stadaas, J. O.; Aune, S. (Ulleval Hosp., Oslo, Norway). *Arch. Surg.* 104(5):684-686, 1972.

2462 PANCREATIC FUNCTION IN PATIENTS WITH GASTRIC ULCER. *(E.)* Whitfield, W. (Kingston Gen. Hosp., Canada). *Lancet* 2(7788):1201, 1972.

2463 VAGAL INFLUENCE ON GASTRIC SECRETION OF HYDROCHLORIC ACID AND SIALIC ACID-CONTAINING MUCOPROTEINS IN THE RAT ON PROVOCATION OF GASTRIC ULCERATION. *(E.)* Carlborg, L.; Dahlgren, S.; Johansson, H.; Lindquist, B.; Nordgren, B. (Univ. Hosp., Uppsala, Sweden). *Upsala J. Med. Sci.* 77:29-32, 1972.

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2469 EFFECT OF PARAPENZOLATE BROMIDE (RELANOL) ON THE GASTRIC ACID SECRETION OF PATIENTS WITH PEPTIC ULCERATION. *(E.)* Fung, W. P. (Fac. Med., Univ. Singapore). *Aust. N.Z. J. Med.* 2(1): 37-38, 1972.

2470 EFFECTS OF THE SPASMOLYTIC AND ANTICHOLINERGIC N-ISOPROPYL-4,4-DIPHENYLCYCLOHEXYLAMINE-HCL (HSp 2986) ON EXPERIMENTAL ULCER IN RATS. *(E.)* Morel, C. J.; Naveiro, J. J. (Fac. Med., Univ. Buenos Aires, Argentina). *Arzneim. Forsch.* 22(6):992-993, 1972.

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2474 THE ROLE OF DISTAL GASTRECTOMY, WITH AND WITHOUT VAGOTOMY, IN THE CONTROL OF CEPHALIC SECRETION AND PEPTIC ULCER DISEASE. *(E.)* Stempien, S. J.; Lee, E. R.; Dagradi, A. E. (VA Hosp., Long Beach, Calif.). *Surgery* 71(1):110-117, 1972.

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2476 STRESS ULCERS. *(E.)* Skillman, J. J.; Silen, W. (Harvard Med. Sch., Boston, Mass.). *Lancet* 2(7790):1303-1306, 1972.

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2488 EPIDEMIOLOGICAL ASPECTS OF DUODENAL ULCERS IN IMMIGRANT LABORERS. *(Ger.)* Gyr, K.; Gemsenjager, E.; Meier, A. L. (St. Clara Hosp., Basel, Switzerland). *Praxis* 61(1):14-19, 1972.

2489 CHOLESTYRAMINE IN POSTVAGOTOMY SYNDROME: PRELIMINARY REPORT. *(E.)* Ayulo, J. A. (California Coll. Med., Irvine). *Am. J. Gastroenterol.* 57(3):207-225, 1972.

2490 CHANGES IN ELECTROGASTROGRAPHIC PARAMETERS INDUCED BY COMBINED THERAPY USING MICROWAVES IN PEPTIC ULCER PATIENTS. *(Rus.)* Chistiakova, N. S.; Skurikhina, L. A.; Mamaeva, Z. K.; Arapova, A. D. (Central Clin. Hosp., Moscow, USSR). *Vopr. Kurortol. Fizioter. Lech. Fiz. Kult.* 37(4):341-344, 1972.

2491 GASTRIC SECRETION OF CALCIUM IN PATIENTS WITH PRIMARY HYPERPARATHYROIDISM BEFORE AND AFTER REMOVAL OF PARATHYROID ADENOMAS. *(E.)* Christiansen, J.; Aagaard, P. (Rigshospital, Copenhagen, Denmark). *Scand. J. Gastroenterol.* 7(7):639-641, 1972.

2492 ETIOLOGY OF GASTRIC ULCER. *(E.)* Rhodes, J. (Univ. Hosp. Wales, Cardiff). *Gastroenterology* 63(1):171-182, 1972.

2493 THE CALENDAR AND DUODENAL ULCER. *(E.)* Hall, W. H.; Read, R. C.; Mesard, L.; Lee, Jr., L. E.; Robinette, C. D. (VA Hosp., Little Rock, Ark.). *Gastroenterology* 62(6):1120-1124, 1972.

2494 GASTRIC ULCER. *(E.)* Bynum, T. E.; Hartsuck, J.; Jacobson, E. D. (Univ. Oklahoma Med. Ctr., Oklahoma City). *Gastroenterology* 62(5):1052-1060, 1972.

2495 COMPARATIVE RESULTS OF OPERATIONS FOR DUODENAL ULCER: A TWENTY YEAR PERSONAL EXPERIENCE. *(E.)* Hoerr, S. O. (Cleveland Clin., Ohio). *Am. J. Surg.* 125(1):3-11, 1973.

2496 FAILURE TO ACHIEVE SUCCESS WITH REMEDIAL GASTRIC SURGERY. *(E.)* Halpern, N. V.; Hirschowitz, B. L.; Moody, F. G. (Univ. Alabama Sch. Med., Birmingham). *Am. J. Surg.* 125(1):108-115, 1973.

2497 GASTRIC ULCER TREATED WITH VAGOTOMY, PYLOROPLASTY, AND EXCISION. *(E.)* Aagaard, P.; Christiansen, J.; Koudahl, G. (Rigshospital, Copenhagen, Denmark). *Scand. J. Gastroenterol.* 7(7):653-656, 1972.

2498 INJURY AND REPAIR IN ACUTE GASTRODUODENAL ULCERATION. *(E.)* Hunt, T. K. (Sch. Med., Univ. California, San Francisco). *Am. J. Surg.* 125(1):12-18, 1973.

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2500 A PROSPECTIVE RANDOMIZED STUDY OF THE ELECTIVE SURGICAL TREATMENT FOR DUODENAL ULCER: TWO- TO TEN-YEAR FOLLOW-UP STUDY. *(E.)* Howard, R. J.; Murphy, W. R.; Humphrey, E. W. (Minneapolis VA Hosp., Minn.) *Surgery* 73(2): 256-260, 1973.

2501 FURTHER EXPERIENCE WITH EPIGASTRIC PAIN REPRODUCTION TEST IN DUODENAL ULCERATION. *(E.)* Earlam, R. J. (London Hosp., England). *Br. Med. J.* 2(5815):683-685, 1972.

2502 THICKNESS OF THE JEJUNAL MUCOSA IN PATIENTS WITH DUODENAL ULCERS BEFORE AND AFTER PARTIAL GASTRECTOMY WITH AND WITHOUT VAGOTOMY. *(Por.)* Magalhaes, A. F. N.; Brandalise, N. A.; Castro, L. A. P.; Rosenberg, D. (no affil.). *Arq. Gastroenterol.* 9(2):47-52, 1972.

2503 THE GASTRO-OESOPHAGEAL JUNCTION IN PATIENTS WITH DUODENAL ULCERATION. *(E.)* Earlam, R. J. (London Hosp., England). *Rendic. Gastroenterol.* 4(2):69-72, 1972.

See also 2093, 2094, 2237, 2239, 2242, 2252, 2258, 2268, 2278, 2281, 2301, 2345, 2349, 2250, 2367, 2369, 2373, 2388, 2507, 2571, 2876, 2879, 2883, 2900, 2931.

2504 INTESTINAL LYMPHANGIECTASIA ASSOCIATED WITH FATAL GASTROINTESTINAL BLEEDING. *(E.)* Poirier, V. C.; Alfidi, R. J. (Cleveland Clin. Hosp., Ohio). *Am. J. Dig. Dis.* 18(1):54-58, 1973.

A case report is presented of a 39-yr-old man with an unusual type of intestinal lymphangiectasia associated with severe gastrointestinal bleeding and multiple vascular hamartomas of the mesentery and small bowel. Angiography failed to visualize bleeding sites since blood oozed from the entire mucosa. Lymphangiography demonstrated passage of contrast medium from abnormal intra-abdominal lymphatics into the gastrointestinal tract. The mechanism of blood loss in this case is thought to be due to an abnormal arterial - capillary - lymphatic - enteric communication pathway.

2505 MUCOSA OF THE SMALL INTESTINE IN FOLATE-DEFICIENT ALCOHOLICS. *(E.)* Hermos, J. A.; Adams, W. A.; Liu, Y. K.; Sullivan, L. W.; Trier, J. S. (Boston Univ. Med. Ctr., Mass.). *Ann. Intern. Med.* 76:957-965, 1972.

Peroral mucosal biopsy specimens from the duodenojejunal junction were obtained from 11 male chronic alcoholics with marrow megaloblastosis caused by folate deficiency. Associated diseases present in these patients included: decompensated cirrhosis (1); acute pancreatitis (2); pneumonia (2); and mild serum hypoproteinemia (4). Patients with severe megaloblastosis (3) had striking histological lesions of the intestinal mucosa including decreased mitoses in the crypts, enlarged-crypt and villous epithelial cells, increased cellularity of the lamina propria, and, in 2 of 3, marked shortening of villi. Quantitation of mitoses, epithelial surface length, and epithelial-cell nuclear size confirmed the histologic observation. Of 8 patients with mild megaloblastosis 5 had similar but less severe intestinal mucosal lesions. Patients with intestinal lesions (6) who were rebiopsied after folate replacement therapy, showed reversion of the intestinal lesion to normal. Administration of large quantities of alcohol to 2 alcoholic volunteers induced histologic changes in the intestinal mucosa only when folate deficiency developed.

2506 THE IMPORTANCE OF SIX COMMON BACTERIA IN INTESTINAL STRANGULATION. *(E.)* Yale, C. E.; Balish, E. (Univ. Wisconsin Med. Sch., Madison). *Arch. Surg.* 104(4):438-442, 1972.

Monocontamination by each of 6 common intestinal bacteria were studied in Sprague-Dawley germ-free rats with ischemic or hemorrhagic strangulation of closed intestinal segments. Six groups of 30 germ-free rats were monocontaminated, each group with a single strain of one microorganism. It was found that: (a) *Bacteroides fragilis*, *Streptococcus faecalia*, and *Lactobacillus acidophilus* were innocuous; (b) *Staphylococcus aureus* 80/81 killed only 17% of the animals; (c) *Proteus vulgaris* and *Pseudomonas aeruginosa* killed over 90% of the animals within 36 hr after strangulation; and (d) monocontamination and operation without strangulation were well tolerated by most of the animals except those infected with *Ps. aeruginosa*. It is concluded that common intestinal bacteria vary greatly in their ability to cause death after intestinal strangulation.

2507 BENIGN GASTROENTERIC FISTULA AND ASPIRIN ABUSE. *(E.)* Peter, M. E.; Benfield, J. R. (Harbor Gen. Hosp., Torrance, Calif.). *Arch. Surg.* 104(6):787-790, 1972.

Case reports are presented for 2 middle-aged women who developed gastroenteric fistulas as a complication of benign gastric ulcers although neither had a history of gastric surgery. Both women had started to take aspirin (9 and 3.6 g/day, resp.) 5 yr before to relieve pain caused by the ulcers. X-ray examinations on a 46-yr-old woman with a 2 yr history of epigastric pain, gastric ulcer, and recent weight loss showed a 4 cm gastric ulcer crater with a fistula between the ulcer and an adjacent loop of jejunum; at surgery the fistula was found to adhere to the pancreas. Uneventful recovery followed resection of 50% of the stomach, the fistulas and 15 cm of jejunum. Reconstruction was by gastroduodenostomy and jejunojejunostomy and was combined with vagotomy. A 52-yr-old woman with a 9 yr history of gastric ulcer had also drunk a half pint of whiskey and smoked a pack of cigarettes daily for 35 yr. X-ray examinations revealed a large penetrating gastric ulcer with gastrocolic fistula and a pedunculated polyp of the sigmoid. Recovery, complicated by congestive heart failure, followed resection of 70% of the stomach, the fistula, and 16 cm of transverse colon. Reconstruction by gastroduodenostomy and colocolostomy was completed by polyp removal via colotomy; no vagotomy was performed. These patients bring to 24 the cases of benign gastroenteric fistula and aspirin abuse reported in the English literature.

2508 IMMUNOGLOBULIN-CONTAINING CELLS IN THE INTESTINAL MUCOSA AND IMMUNOGLOBULINS IN THE INTESTINAL JUICE IN CHILDREN. *(E.)* Savilahti, E. (Children's Hosp., Univ. Helsinki, Finland). *Clin. Exp. Immunol.* 11(3):415-425, 1972.

Prolonged or recurrent diarrhea, vomiting, failure to thrive, and recurrent abdominal pain were studied in 30 children, aged 3 months-16 yr. The numbers of immunoglobulin-containing cells in the mucosa of the small intestine and rectum were counted by a direct immunofluorescence technique in biopsy specimens. Immunoglobulin (Ig) in the intestinal juice of the same patients was quantified by electroimmunodiffusion. In all biopsy specimens IgA-containing cells predominated. These cells were more numerous in specimens from children over 2 yr than in those from younger children. The cells were fairly evenly distributed along the intestinal tract. The number of IgM-containing cells did not change with age. In the intestinal juice the mean content of IgA was higher than that of the other immunoglobulins. More IgM and less IgA were found in the juice of infants under 2 than in that of older children. The results suggest that quantitatively the IgA-producing system of the gut is not fully developed in infancy, whereas the reverse is true for the cells producing IgM.

2509 PATHOGENESIS OF CONGENITAL ALKALOSIS WITH DIARRHEA: IMPLICATIONS FOR THE PHYSIOLOGY OF NORMAL ILEAL ELECTROLYTE ABSORPTION AND SECRETION. *(E.)* Bieberdorf, F. A.; Gorden, P.; Fordtran, J. S. (Univ. Texas Southwestern Med. Sch., Dallas). *J. Clin. Invest.* 51(8): 1958-1968, 1972.

Ileal electrolyte transport in a patient with congenital alkalosis with diarrhea has been studied using a triple-lumen constant perfusion system. Chloride is not transported against electrochemical gradients, but is readily absorbed or secreted down electrochemical gradients. Chloride secretion down an electrochemical gradient can be increased by raising lumen bicarbonate concentration. Sodium absorption occurs against electrochemical gradients and is associated with hydrogen ion secretion. Electrical potential difference between lumen and blood is near zero when lumen sodium concentration is 140 mEq/liter. A normal sodium diffusion potential is present; potassium is transported passively in response to electrochemical gradients. Normal subjects, when perfused with a solution in which chloride is replaced with poorly absorbable sulfate and phosphate, can simulate the ileal electrolyte transport disorder of congenital alkalosis with diarrhea. These results suggest a single defect in the double ion exchange model (sodium-hydrogen, chloride-bicarbonate) previously proposed for normal ileal transport; i.e., normal sodium-hydrogen exchange, but a chloride-bicarbonate exchange that is incapable of transporting chloride against an electrochemical gradient, yet continues to transport anions passively. These results appear incompatible with ileal electrogenic sodium transport.

2510 VILLOUS ADENOMAS OF THE SMALL INTESTINE. *(E.)* Steinberg, L. S.; Schieber, W. (Jewish Hosp., St. Louis, Mo.). *Surgery* 71(3): 423-428, 1972.

Case reports are presented for 4 patients (3 females, aged 67-76 yr and 1 male, aged 14 yr) with villous adenomas of the small intestine. A villous polyp with focal carcinoma was removed by duodenotomy without resection of the duodenal wall from a 67-yr-old women with a 3 yr history of gastrointestinal bleeding and a filling defect in the 3rd part of the duodenum. No evidence of recurrence was found 3 yr 7 months after surgery. At laparotomy, a 14-yr-old boy had a jejunojejunal intussusception caused by 2 jejunal polyps diagnosed as papillary adenomas. The patient is alive and well 20 yr after jejunal resection with jejunojejunostomy. X-ray examinations of a 76-yr-old woman showed cholelithiasis and a possible villous adenoma in the 2nd part of the duodenum; this was confirmed at laparotomy. The patient died of unrelated disease 1.5 yr later and, on autopsy, had 2 adenomatous (nonvillous) polyps of the duodenum. Radiological examination of a 67-yr-old woman with recurrent vomiting showed a tumor of the proximal jejunum with dilatation of the ileum and distal jejunum. The tumor, diagnosed as a villous adenoma with focal adenocarcinoma, was removed by resection of the jejunum with end-to-end jejunojejunostomy. No evidence of a recurrence was found at reoperation for adhesions 8 months later or in the 18 months following her second operation. Findings in these patients and in 13 others previously reported in the English literature suggest that villous adenomas of the small intestine behave the same as villous adenomas of the colon. When feasible, it is recommended that tumors be resected with some surrounding normal tissue, usually by resection of the intestine.

2511 PASSIVE ABSORPTION OF A LOW-MOLECULAR COMPOUND (VITAMIN B_{12}) BY THE DAMAGED SMALL INTESTINE: A METHOD FOR QUANTITATIVE STUDIES. *(E.)* Frauchiger, J. P.; Kummer, H.; Lundsgaard-Hansen, P. (Inselspital, Bern, Switzerland). *Surgery* 71(3):357-363, 1972.

A method employing two isolated intestinal segments and vitamin B_{12} labeled with ^{57}Co or ^{58}Co is described. This method, which was used on 9 adult dogs, permits a quantitative study of the passive absorption of that compound through the damaged intestinal wall. Each animal served as its own control. Preoperative saturation was obtained with an i.v. infusion of 0.9% saline containing 1.0 mg/liter of "cold" vitamin B_{12}; this was kept running throughout the experiment, ensuring a urinary output of about 1,500 ml for a 10 hr period. Absorption was increased following reversible ischemia, and a relation to the degree of ischemia was apparent. Absorption was less marked following venous occlusion with clinically more severe damage, possibly because of the resulting intramural edema. The method presented or the adaptation to the use of other low-molecular, tagged compounds should provide a sensitive tool for studying absorption from the damaged intestine and the relation to the pathophysiology of intestinal obstruction.

2512 DISTURBANCES IN TISSUE RESPIRATION AND METHODS FOR NORMALIZING IT IN ACUTE EXPERIMENTAL INTESTINAL OBSTRUCTION. *(Rus.)* Kolibaba, S. S. (N. I. Pirogov Med. Inst., Vinnitsa, USSR). *Eksp. Khir. Anesteziol.* 17(4):40-43, 1972.

2513 CALCULI IN A MECKEL'S DIVERTICULUM: A CAUSE OF CHRONIC ANEMIA. *(E.)* Kavlie, H.; Marchioro, T. L. (Univ. Washington Sch. Med., Seattle). *Gastroenterology* 62(6):1238-1240, 1972.

2514 LOWER GASTROINTESTINAL BLEEDING DUE TO ULCERATIONS IN A MECKEL'S DIVERTICULUM AND ADJACENT ILEUM WITH ENTEROLITHS FORMATION. *(E.)* Haimov, M.; Rybak, B. J.; Greenberg, E. I.; Dreiling, D. A. (Mt. Sinai Hosp. Svcs. City Hosp. Ctr., Elmhurst, N.Y.). *Am. J. Gastroenterol.* 58(5):497-501, 1972.

2515 SURGICAL ALTERATION OF INTESTINAL MOTILITY. *(E.)* Schiller, W. R.; Suriyapa, C.; Mutchler, J. H. W.; Anderson, M. C. (Med. Coll. of Ohio, Toledo). *Am. J. Surg.* 125(1):122-128, 1973.

2516 AORTODUODENAL FISTULAS AFTER AORTIC PROSTHESIS. *(Fr.)* Lena, A.; Adhoute, B.; Quilichini, F. (Hop. de la Conception, Marseille, France). *Chirurgie* 98(5):333-337, 1972.

2517 WHY ARE SMALL-BOWEL TUMOURS SO RARE? *(E.)* Lowenfels, A. B. (Grasslands Hosp. Valhalla, N.Y.). *Lancet* 1(7793):24-25, 1973.

2518 INTESTINAL OBSTRUCTION PRODUCED BY OEDEMA OF THE SMALL BOWEL. *(E.)* Perdikis, P.; Schmaman, A.; Gien, L. (Baragwanath Hosp. S. African Inst. for Med. Res.). *S. Afr. J. Surg.* 9(2):87-91, 1971.

2519 GASTRODUODENAL MUCOSAL CHANGES IN CHRONIC UREMIA. *(E.)* Dorph, S.; Oigaard, A.; Pedersen, G.; McNair, A.; Sorensen, M. B. (Rigshospitalet, Copenhagen, Denmark). *Scand. J. Gastroenterol.* 7(7):589-592, 1972.

2520 A TECHNIQUE FOR INTESTINAL DEOOMPRESSION: SODIUM LOSS IN INTESTINAL OBSTRUCTION. *(E.)* Grosz, C. R.; Dennis, C. (State Univ. New York, Downstate Med. Ctr., Brooklyn). *Surgery* 73(2):168-170, 1973.

2521 EXTRINSIC DUODENAL OBSTRUCTION IN CHILDREN. *(E.)* Wayne, E. R.; Burrington, J. D. (Children's Hosp., Denver, Colo.). *Surg. Gynecol. Obstet.* 136(1):87-91, 1973.

2522 SPONTANEOUS AORTODUODENAL FISTULA. *(E.)* Evans, D. M.; Webster, J. H. H. (Roy. South Hants Hosp., Southhampton, England). *Br. J. Surg.* 59(5):368-372, 1972.

2523 ACQUIRED LACTOSE INTOLERANCE AS A DIAGNOSTIC AND THERAPEUTIC PROBLEM. *Ser.)* Filipovic, D.; Hajdukovic, R.; Vulovic, . (Inst. Maternal Child Welfare, Belgrade, Yugoslavia). *Srp. Arh. Celok. Lek.* 99(10/11):703-10, 1971.

2524 DUPLICATION OF THE SMALL INTESTINE. *(E.)* Uhrich, P. C. (no affil.). *Am. J. Gastroenterol.* 58(4):447-449, 1972.

2525 PREOPERATIVE DIAGNOSIS OF BLEEDING MECKEL'S DIVERTICULUM UTILIZING ^{99m}TECHNETIUM PERTECHNETATE SCINTI-IMAGING. *(E.)* Jaros, R.; Schussheim, A.; Levy, L. M. (Long Island Jewish-Hillside Med. Ctr., New Hyde Park, N.Y.). *J. Pediatr.* 82(1):45-49, 1973.

2526 WEEKLY CLINICOPATHOLOGICAL EXERCISES. [CARCINOID OF THE ILEUM WITH METASTASES TO MESENTERIC LYMPH NODES AND LIVER.] *(E.)* Abrams, H. L.; Donaldson, G. A.; Maynard, E. P. (Peter Bent Brigham Hosp., Boston, Mass.). *N. Engl. J. Med.* 288(1):36-43, 1973.

2527 INTESTINAL TUBERCULOSIS: ANATOMICAL AND CLINICAL FEATURES (33 CASES). *(Por.)* de Benedicto, J. M.; Haddad, J.; de Paula, W.; Raia, A. (Clin. Hosp., Fac. Med. Univ. Sao Paulo, Brazil). *Arq. Gastroenterol.* 9(2):65-70, 1972.

2528 BILE DUCT ANOMALIES ASSOCIATED WITH DUODENAL ATRESIA: PARADOXICAL PRESENCE OF SMALL BOWEL GAS. *(E.)* Kassner, E. G.; Sutton, A. L.; De Groot, T. J. (State Univ. New York, Downstate Med. Ctr., Brooklyn). *Am. J. Roengtenol. Radium Ther. Nucl. Med.* 116(3):577-583, 1972.

2529 MALIGNANT CARCINOID ASSOCIATED WITH THORACO-ABDOMINAL ANEURYSM AND ANALYSIS OF THIRTY-ONE CASES OF GASTROINTESTINAL CARCINOID TUMORS. *(E.)* Cunningham, P. J.; Norman, J.; Cleveland, B. R. (Univ. Texas Med. Br., Galveston). *Ann. Surg.* 176(5):613-619, 1972.

2530 CASE OF A MALIGNANT CARCINOID OF THE COLON AND ILEUM TREATED AS A PERI-APPENDICULAR INFILTRATE. *(E.)* Wieczorek, J.; Sliwinski, M. (Provincial Hosp., Krakow, Poland). *Wiad. Lek.* 25(16):1491-1483, 1972.

2531 AN UNUSUAL CASE OF MECKEL'S DIVERTICULUM. *(Pol.)* Janicki, W.; Wozniacki, W. (Acad. Med., Lublin, Poland). *Wiad. Lek.* 25(17):1571-1573, 1972.

2532 RETROPERITONEAL RUPTURE OF THE DUODENUM. *(Ger.)* Schmidt, A. (Joint Health Institutions, Waren/Muritz, Germany). *Zentralbl. Chir.* 97(21):693-695, 1972.

2533 ARTERIO-MESENTERIC DUODENAL OCCLUSION. *(Pol.)* Lazecki, L. (Acad. Med., Warsaw, Poland). *Wiad. Lek.* 25(16):1473-1476, 1972.

2534 MULTIPLE SEPTA OF THE SMALL BOWEL: DESCRIPTION OF AN UNUSUAL CASE, WITH A REVIEW OF THE LITERATURE AND CONSIDERATION OF ETIOLOGY. *(E.)* Rittenhouse, E. A.; Beckwith, J. B.; Chappell, J. S.; Bill, A. H. (Children's Orthopedic Hosp., Seattle, Wash.). *Surgery* 71(3): 371-379, 1972.

2535 TUBERCULOUS ENTERITIS WITH PERFORATION AND ABSCESS FORMATION IN CHILDHOOD. *(E.)* Porter, J. M.; Snowe, R. J.; Silver, D. (Duke Univ. Med. Ctr., Durham, N.C.). *Surgery* 71(2): 254-257, 1972.

2536 HIGH OUTPUT ENTEROCUTANEOUS FISTULAS OF THE SMALL BOWEL: AN ANALYSIS OF FIFTY-FIVE CASES. *(E.)* Roback, S. A.; Nicoloff, D. M. (Univ. Hosp., Minneapolis, Minn.). *Am. J. Surg.* 123(3):317-322, 1972.

2537 GASTROINTESTINAL HEMANGIOMAS. *(E.)* Pradhan, D. J.; Juanteguy, J. M.; Musikabhumma, S.; Ulfohn, A. (Sinai Hosp., Baltimore, Md.). *Arch. Surg.* 104(5):704-706, 1972.

2538 SURGICAL PROCEDURES UPON JUXTA-AMPULLAR DUODENAL DIVERTICULA. *(E.)* Pinotti, H. W.; Tacla, M.; Fernandes Pontes, J.; Bettarello, A. (Inst. Gastroenterol., Sao Paulo, Brazil). *Surg. Gynecol. Obstet.* 135(1):11-16, 1972.

2539 INTESTINAL OBSTRUCTION DUE TO LEIOMYOMA OF THE ILEUM. *(E.)* Ulvi, M.; Teitelbaum, S.; Ram, M. D. (Huron Road Hosp., Cleveland, Ohio). *Am. Surg.* 38(8):439-442, 1972.

2540 MECKEL'S DIVERTICULUM. *(E.)* Ram, Sri; Arcari, F. (William Beaumont Hosp., Royal Oak, Mich.). *J. Am. Med. Womens Assoc.* 27(3):123-132, 1972.

2541 THE PROBLEMS OF MECKEL'S DIVERTICULUM. *(Ger.)* Petritsch, P. (Surg. Clin., Univ. Graz, Austria). *Zentralbl. Chir.* 97(26):879-881, 1972.

2542 CONGENITAL DUODENAL STENOSIS CAUSING INTESTINAL OBSTRUCTION IN THE ADULT: CASE REPORT AND REVIEW OF LITERATURE. *(E.)* Raquel, J. A.; Easley, G. W.; Watne, A. L.; Mendoza, Jr., C. B. (VA Hosp., Clarksburg, W. Va.). *Am. Surg.* 38(8):413-417, 1972.

2543 ENDOMETRIOSIS OF THE ILEUM: FOUR CASES WITH OBSTRUCTION. *(E.)* Venable, J. H. (Med. Ctr. Hosp., Columbus, Ga.). *Am. J. Obstet. Gynecol.* 113(8):1054-1055, 1972.

2544 MALIGNANT LYMPHOMA OF THE SMALL INTESTINE PRESENTING AS MALABSORPTION. *(Gr.)* Morali, A.; Goulis, G. (2nd Med. Clin., Univ. Thessalonika, Greece). *Galenus* 13(6):788-795, 1971.

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2546 THE STATUS OF SURGICAL TREATMENT FOR EXTERNAL POSTOPERATIVE FISTULAS OF THE SMALL INTESTINE: 17 CASES. *(Fr.)* Hollender, L. F.; Meyer, C.; Pagliano, G.; Otteni, F. (Univ. Hosp. Ctr., Strasbourg, France). *Ann. Chir.* 26(11/12):623-630, 1972.

2547 COMPLETE AVULSION OF THE JEJUNUM FROM THE DUODENUM FOLLOWING BLUNT ABDOMINAL TRAUMA. *(Pol.)* Sycinski, Z.; Zakowicz-Lakomiec, J. (L. Rydygier Munic. Hosp., Wroclaw, Poland). *Wiad. Lek.* 25(19):1773-1775, 1972.

2548 A CHILD WITH ACUTE ABDOMEN CAUSED BY TWISTING OF THE SMALL INTESTINE DUE TO THE TURNING OF AN INTESTINAL CYSTOMA ON ITS STALK AND MECKEL'S DIVERTICULUM. *(Ger.)* Schmidt, E.; Nitzshe, L. (Regional Hosp., Dresden-Friedrichstadt, Germany). *Zentralbl. Chir.* 97(23):790-792, 1972.

2549 PERFORATION OF THE SMALL INTESTINE IN THE COURSE OF POLYARTERITIS NODOSA: A RARE COMPLICATION. *(Fr.)* Siegenthaler, H.; Egger, G. (Hopital de l'Ile, Bern, Switzerland). *Praxis* 61(25):836-840, 1972.

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2552 INTRAMURAL HEMATOMA OF THE SMALL INTESTINE DURING DICUMAROL THERAPY. *(Ger.)* Hartel, M. (Univ. Lund, Malmo, Sweden). *Fortschr. Geb. Roentgenstr. Nuklearmed.* 117(3):306-311, 1972.

2553 INTESTINAL PERFORATION CAUSED BY A PHYTOBEZOAR. *(Sp.)* Parrilla Paricio, P.; Lledo Matoses, S.; Peydro Olaya, A. (Fac. Med., Valencia, Spain). *Med. Esp.* 67:294-300, 1972.

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2557 CLUBBING AND OSTEOARTHROPATHY ASSOCIATED WITH PRIMARY UPPER SMALL INTESTINAL LYMPHOMA. *(E.)* Bakhshandeh, K.; Nasr, K.; Haghighi, P. aghshenas, M. (Saadi Hosp., Shiraz, Iran). *J. rop. Med. Hyg.* 74(5):117-119, 1971.

2558 PATHOLOGY OF THE SMALL INTESTINE. *(Sp.)* Toccalino, H.; Braillard, C.; Licastro. .; Nino, R.; Garcia-Cardo, A.; Williams, M. o affil.). *Arch. Pediatr. Uruguay* 42(5):349-352, 971.

2559 TUMORS OF THE SMALL INTESTINE. *(Heb.)* Zer, M.; Assodi, A.; Wolloch, Y.; Dintsman, . (A. Beilinson Hosp., Petah Tikvah, Israel). *arefuah* 82(2):451-454, 1972.

560 A METHOD FOR TESTING THE FUNCTIONAL SIGNIFICANCE OF TIGHT ILEOSTOMY STOMAS. *E.)* Wright, H. K.; Tilson, M. D. (Yale Univ. ch. Med., New Haven, Conn.). *Am. J. Surg.* 123(4): 17-420, 1972.

561 OCCURRENCE OF BOTH CONGENITAL DUODENAL DIPHRAGM AND VASCULAR COMPRESSION OF HE DUODENUM IN AN ELDERLY PATIENT. *(E.)* Sutherland, . E. R.; Miller, I. D.; Najarian, J. S. (Univ. innesota Health Sci. Ctr., Minneapolis). *Am. J. urg.* 23(3):351-355, 1972.

562 EXCISIONAL THERAPY FOR ULCEROGENIC TUMORS OF THE DUODENUM. LONG-TERM RESULTS. *(E.)* erhalman, Jr., H. A. (Stanford Univ. Sch. Med., anford, Calif.). *Arch. Surg.* 104(4):447-453, 1972. 72.

2563 RADIATION-INDUCED ILEUS. *(Ger.)* Fochem, K. (Munic. Hosp., Wien-Lainz, Austria). *Wien. Z. Inn. Med.* 53(4):221-226, 1972.

2564 CARCINOID NEOPLASMS OF THE SMALL INTESTINE. (CLINICAL CASES OF OBSTRUCTION, INTUSSUSCEPTION, AND COMPRESSION). *(It.)* Bonandrini, L.; Mantellini, E.; Cebrelli, C. (Inst. Clin. Gen. Surg. Ther., Univ. Pavia, Italy). *Minerva Chir.* 27(10): 568-589, 1972.

2565 EXTRUSION OF SMALL INTESTINE DUE TO RUPTURE OF PREVIOUSLY NORMAL UMBILICUS. *(E.)* Metcalf, P. J.; Price, S. (Nevill Hall Hosp., Abergavenny, England). *Br. Med. J.* 2(5815):692-693, 1972.

2566 SEAT BELT INJURY: TRIPLE TRANSECTION OF SMALL BOWEL. *(E.)* Romino, J. D. (no affil.). *J. Abdominal Surg.* 14(7):129-130, 1972.

2567 A CASE OF MALIGNANT CHANGE OF NEUROFIBROMATOSIS ACCOMPANIED BY MALIGNANT CARCINOID OF THE DUODENUM AND CYSTIC ADENOMA OF THE THYROID GLAND. *(E.)* Takanari, H.; Kato, K.; Mukai, S. (Mie Prefectural Univ. Sch. Med., Tsu, Japan). *Mie Med. J.* 21(2):185-192, 1971.

2568 URINARY TRACT CALCULI AFTER INTESTINAL SHUNT OPERATIONS FOR THE TREATMENT OF OBESITY. *(E.)* Dickstein, S. S.; Frame, B. (Henry Ford Hosp., Detroit, Mich.). *Surg. Gynecol. Obstet.* 136(2):257-260, 1973.

2569 ENTEROCOLONIC FISTULA IN AN INFANT CAUSED BY A PERFORATED MECKEL DIVERTICULUM. *(Ger.)* Schickedanz, H.; Schramm, H.; Wagner, W. (Surg. Clin., Friedrich Schiller Univ., Jena, Germany). *Zentralbl. Chir.* 1174-1178, 1972.

2570 CAUSES, CLINICAL FEATURES, AND SYMPTOMATOLOGY OF MECHANICAL ILEUS. *(Ger.)* Neumayr, A. (Empress Elisabeth Hosp., Vienna, Austria). *Wien. Klin. Wochenschr.* 84(27/28):442-446, 1972.

See also 2061, 2253, 2262, 2264, 2265, 2267, 2274, 2280, 2285, 2295, 2305, 2315, 2351, 2359, 2393, 2397, 2413, 2450, 2451, 2573, 2591, 2592, 2595, 2618, 2624, 2641, 2652, 2669, 2693, 2700, 2702, 2794, 2891, 2898, 2901, 2908.

SMALL INTESTINE

Regional Enteritis

571 THE RELATIONSHIP BETWEEN GRANULOMATOUS BOWEL DISEASE AND DUODENAL ULCER. *(E.)* nders, M. G.; Schimmel, E. M. (Boston VA Hosp., ss.). *Am. J. Dig. Dis.* 17(12):1100-1108, 1972.

Of 122 patients with inflammatory bowel disease, 15 also had duodenal ulcers. Duodenal ulcers were present in 9 of 34 patients (32 male, 2 female) with Crohn's disease confined to small bowel, 3 of 24 with granulomatous ileocolitis, (23 male, 1 female), and 3 of 64 with ulcerative colitis (62 male, 2 female). The higher incidence of ulcers in Crohn's disease of both small and large bowel, analyzed either separately or together. was significantly higher than in the ulcerative colitis group. Gastric analyses revealed no significant differences in gastric acid secretion among the 3 groups. There was no relation between extent and site of small bowel involvement and gastric acid secretion. The high incidence of ulcers in granulomatous bowel disease remains unexplained. Since 4 of the 15 ulcer patients had the duodenal ulcers long before the onset of inflammatory bowel disease, corticosteroids played no important role in ulcer pathogenesis. Of the 10 whose inflammatory disease antedated the ulcer and the 1 in which Crohn's disease and the ulcer occurred simultaneously, only 3 took corticosteroids before ulcer symptoms occurred.

2572 BILE SALT AND LIPID METABOLISM IN PATIENTS WITH ILEAL DISEASE WITH AND WITHOUT STEATORRHEA. *(E.)* Mansbach, II, C. M.; Garbutt, Jr., J. T.; Tyor, M. P. (VA Hosp., Durham, N.C.). *Am. J. Dig. Dis.* 17(12):1089-1099, 1972.

Postprandial duodenal contents and the enterohepatic circulation of i.v. administered sodium 24-^{14}C-taurocholate were studied in 8 patients with ileal disease (7 with regional enteritis, 1 with small intestine resected for gangrene; 6 male, 2 female, aged 17-48 yr). Data was compared with that of a control group. Some patients (7) had an interrupted enterohepatic circulation of taurocholate; all had a normal fasting cholate pool size. Studies on the postprandial duodenal contents showed that 7 patients had concentrations of cholate and aqueous phase lipid comparable to controls during the first 30 min after feeding, whereas these values were comparably reduced during the next 90 min. Special considerations were given to 1 patient with steatorrhea (had an unstimulated release of bile salts into his duodenum, with resultant low cholate and aqueous phase lipid values during the entire study), 1 patient with Crohn's disease (was physiologically normal), and 2 patients with no steatorrhea (but with an interrupted enterohepatic taurocholate circulation). These results point up the value of correlative studies and suggest that in certain patients lipid absorption may successfully compensate for an interrupted enterohepatic circulation of bile salts.

2573 PSEUDOMEMBRANOUS ENTEROCOLITIS. *(E.)* Knezevic, S.; Bakran, I.; Krstulovic, B. (Univ. Zagreb Med. Sch., Yugoslavia). *Acta Med. Iugosl.* 25(1):67-80, 1971.

2574 CROHN'S DISEASE OF THE SMALL INTESTINE AND STOMACH. *(E.)* Fielding, J. F. (Radcliffe Infirm., Oxford, England). *Br. J. Hosp. Med.* 7(6):767-774, 1972.

2575 ACQUIRED HYPEROXALURIA, NEPHROLITHIASIS, AND INTESTINAL DISEASE: DESCRIPTION OF A SYNDROME. *(E.)* Smith, L. H.; Fromm, H.; Hofmann, A. F. (Mayo Clin., Rochester, Minn.). *N. Engl. J. Med.* 286(26):1371-1375, 1972.

2576 ILEITIS TERMINALIS NONSCLEROTICANS IN CHILDREN. *(E.)* Winnicki, S.; Zalewski, T.; Jakubowska, D. (Med. Acad., Warsaw, Poland). *Pol. Res. Radiol. Nucl. Med.* 35(4):412-416, 1971.

2577 MILIARY CROHN'S DISEASE. *(E.)* Manns, J. J. (Roy. Infirm., Dundee, Scotland). *Br. Med. J.* 4(5833):152, 1972.

2578 MASSIVE UPPER GASTROINTESTINAL TRACT HEMORRHAGE: A MANIFESTATION OF REGIONAL ENTERITIS OF THE DUODENUM. *(E.)* Paget, E. T.; Peniston, W. O.; Mathewson, Jr., C. (David Grant USAF Med. Ctr., Travis AFB, Calif.). *Arch. Surg.* 104(4):397-400, 1972.

2579 PERIANAL ULCERATION AS A DIAGNOSTIC SIGN FOR CROHN'S REGIONAL ENTERITIS. *(Ger.)* Weidner, F.; Hornstein, O. P. (Dermatol. Clin., Univ. Erlangen, Germnay). *Z. Haut Geschlechtskr.* 46(249):831-837, 1971.

See also 2608, 2653, 2646, 2650, 2671, 2679, 2683, 2684.

SMALL INTESTINE

Malabsorption

2580 INTESTINAL MICROFLORA AND ABSORPTION IN PATIENTS WITH STAGNATION-INDUCING LESIONS OF THE SMALL INTESTINE. *(E.)* Farrar, W. E.; O'Dell, N. M.; Achord, J. L.; Greer, H. A. (Med. Univ. South Carolina, Charlestown). *Am. J. Dig. Dis.* 17(12):1065-1074, 1972.

Intestinal microflora and absorption were investigated in 8 patients (3 male, 5 female, aged 57-82 yr) with stagnation-inducing lesions of the small intestine (5 with small bowel diverticulosis and 3 postgastrectomy patients). In 4 patients studies were carried out before and after administration of antibiotics. *Escherichia coli* was present in all 8 patients, *Bacteroides* in 5, anaerobic bacilli in 1, *Proteus* in 1, nonhemolytic streptococci, in 1, *Klebsiella* in 1, *Enterobacter* in 2, and *Clostridium* in 1. There was a correlation between steatorrhea and the presence of *Bacteroides* or other bile-salt-deconjugating bacteria in the upper small intestine. In 3 patients administration of antibiotics resulted in improvement in steatorrhea and disappearance of *Bacteroides* or unconjugated bile acids or both. There was no correlation between total bacterial count or number of enterobacteria present and steatorrhea. These studies substantiate the thesis that the presence in the upper small intestine of bacteria capable of deconjugating bile salts is the major cause of steatorrhea in patients with stagnation-inducing lesions of the small intestine.

2581 INTESTINAL FLORA IN PATIENTS WITH CHRONIC BRONCHITIS AND MALABSORPTION SYNDROME.

(E.) Marano, R.; Pastore, G.; Stano, G.; Schiraldi, O. (2nd Inst. Clin. Med., Univ. Bari, Italy). *Boll. Inst. Sieroter. Milan.* 51(2):118-123, 1972.

A study was made of the small bowel flora of 15 patients with chronic bronchitis and 10 normal controls. The results suggest that jejunal bacterial contamination could be the source of malabsorption in such patients. Staphylococci were present in 10 patients and only 1 control; Streptococci in 8 patients (absent in controls); Lactobacilli in 3 patients and 4 controls; Mycetes in 7 patients and 4 controls; Neisseria in 3 patients (absent in controls); and *Klebsiella pneumoniae* in 1 patient (absent in controls). The possible pathogenetic role of such bacterial contamination is not clear.

2582 IN VITRO UPTAKE OF LYSINE AND ALANINE BY HUMAN JEJUNAL MUCOSA IN PROTEIN-CALORIE MALNUTRITION IN GASTROENTERITIS AND AFTER NEOMYCIN.

(E.) Woodd-Walker, R. B.; Hansen, J. D. L.; Saunders, S. J. (Red Cross War Memorial Children's Hosp., Cape Town, South Africa). *Acta Paediatr. Scand.* 61(2):140-144, 1972.

The uptake *in vitro* of lysine and alanine by jejunal mucosa was investigated in 5 children (17 months-4 yr old) with kwaskirokor-apathy, skin and hair changes, edema, and nutritional hypoalbuminemia; in 7 children (1-3 yr old) needing i.v. therapy for acute gastroenteritis; and after neomycin therapy. Salmonella were grown from 2 cases. Trophozoites of *Giardia lamblia* were found in 4 from each group. Five children had lactose intolerance. No consistent evidence of abnormality was found in the uptake of amino acids in any of these conditions.

2583 INTESTINAL MALABSORPTION CAUSED BY AMINOSALICYLIC ACID THERAPY. *(E.)*

Halsted, C. H.; McIntyre, P. A. (Johns Hopkins Univ. Sch. Med., Baltimore, Md.). *Arch. Intern. Med.* 130(6):935-939, 1972.

A 78-yr-old woman presented with the clinical picture of subacute combined degeneration of the spinal cord after 18 months of therapy with 12 g/day aminosalicylic acid and 400 mg/day isoniazid for presumed disseminated tuberculosis. The neurologic defect was corrected by parenterally administered cyanocobalamin (100 µg/week). Exposure to full doses of aminosalicylic acid caused weight loss, diarrhea, steatorrhea, and malabsorption of *d*-xylose and vitamin B_{12} although the intestinal mucosa was normal under the light microscope. All these indices were reversed on discontinuation of the drug. On subsequent exposure to aminosalicylic acid, the malabsorption syndrome reappeared, with a fall in intestinal disaccharidase activities but with normal intraluminal fat digestion. Vitamin B_{12} malabsorption was related to the dose of aminosalicylic acid which may directly interfere with ileal transport of the vitamin. Aminosalicylic acid, like neomycin sulfate and colchicine, probably interferes with intestinal mucosal transport processes and should be suspected as a cause of weight loss and malabsorption in patients being treated with this drug.

2584 FINGERPRINTS IN PATIENTS WITH COELIAC DISEASE AND THEIR RELATIVES. *(E.)*

Mylotte, M.; Egan-Mitchell, B.; Fottrell, P. F.; McNicholl, B.; McCarthy, C. G. (Univ. Coll., Galway, Eire). *Br. Med. J.* 4(5833):144-146, 1972.

The incidence of fingerprint pattern abnormality in 53 patients (18 males, 35 females) with celiac disease and 82 of their relatives was studied. These 53 patients all had subtotal villous atrophy of the proximal small intestine at the time of diagnosis. Of the 53, 22 were under 12 yr of age. Fingerprint abnormality was not greater than that found in 58 control subjects. The 58 controls consisted of 28 patients (13 males) undergoing gastrointestinal investigation but having normal jejunal mucosa on biopsy, 8 children with various disorders who were not biopsied, and 22 subjects (9 males) known to have a normal jejunal biopsy. This finding contradicts an earlier report that most patients with celiac disease have abnormal fingerprints.

2585 A STUDY BY PERFUSION TECHNIQUES OF THE ABSORPTION ABNORMALITIES IN THE JEJUNUM IN ADULT COELIAC DISEASE.

(E.) Russell, R. I.; Allan, J. G.; Gerskowitch, V. P.; Roberts J. W. K. (Roy. Infirm., Glasgow, Scotland). *Clin. Sci.* 42(6):735-741, 1972.

The transport of water, sodium, and chloride, across the jejunal mucosa was studied in 14 patients (5 male, 9 female; aged 21-60 yr) with untreated adult celiac disease by using a triple-lumen tube perfusion system. Using an isoosmotic glucose-saline mixture, with final osmolality of 300 mosmol/l, at a constant flow rate of 20 ml/min. The results were compared with normal control volunteers (9 male, 6 female; aged 28-68 yr). Evidence suggested that not only was absorption impaired in the adult celiac disease group, but that in some patient there was secretion of water and electrolytes. No significant improvement had occurred in 6 patients 2-4 months after withdrawal of gluten, nor in one patient after 8 months, in spite of histological improvement and clincal remission.

2586 DISACCHARIDASE ACTIVITY IN THE RECTAL MUCOSA. *(E.)* Drukker, A.; Goldstein, R.; Maeir, D. M.; Freier, S. (Shaare Zedek Gen. Hosp., Jerusalem, Israel). *Israel J. Med. Sci.* 8(4):502-507, 1972.

The activities of maltase, sucrase, and lactase were determined in rectal biopsies taken from 20 children, aged 3-24 months, without gastrointestinal disturbances, from 6 with celiac disease, from 6 with protracted diarrhea, and from 1 infant with congenital sucrase-isomaltase deficiency. In 23 of the children enzyme activities were determined in duodenal biopsy specimens. In addition, maltase activity was demonstrated histochemically in the rectal mucosa in 2 children. Whenever disaccharidase activity was present in the duodenum, similar activity was present in the rectal biopsy specimens, although at a much lower level. Disaccharidase in the rectum showed a wide range of activity in normal infants; it was not reduced in children with celiac disease, but was uniformly low in the cases with protracted diarrhea. No sucrase or isomaltase activity in the rectum was found in a child with congenital duodenal deficiency of these enzymes. The degree of lactase depression in celiac disease could not be related to the age of the patient nor to the severity of the absorptive defect as measured by the fat balance. The histochemical demonstration of maltase activity in rectal biopsies and its localization in mucosal cells supports the conclusion that true mucosal enzymic activity was measured. Estimation of enzyme activity in the rectal mucosa can be of help in cases in whch peroral biopsy is contra-indicated and can aid in distinguishing primary from secondary deficiency. It will not distinguish celiac disease from protracted diarrhea. If possible, disaccharidase estimations from peroral biopsies are preferred.

2587 HISTOCOMPATIBILITY ANTIGENS ASSOCIATED WITH ADULT COELIAC DISEASE. *(E.)* Stokes, P. L.; Asquith, P.; Holmes, G. K. T.; Mackintosh, P.; Cooke, W. T. (Dept. Exp. Pathol., Univ. Birmingham, England). *Lancet* (7769):162-164, 1972.

The histocompatibility (HL-A) antigen phenotype of 49 patients with adult celiac disease was studied. Of these 49 patients, 3 had developed lymphoma and 1 had carcinoma *in situ* (skin and rectum). HL-A1 occurred in 78% and HL-A8 in 83% of these patients, compared with 33.2% and 29.5%, resp., in a control population of 268 people, (159 healthy subjects and 109 potential renal transplant donors). All patients and controls were Caucasian and British. The frequency of the combination HL-A1 plus HL-A8 in adult celiac disease patients was 75%, compared with 20.1% in the controls. The difference in each instance is highly significant. This difference in frequency of HL-A antigens found in adult celiac disease patients suggests that genetic factors may be important in the etiology of adult celiac disease. However, since HL-A1 and HL-A8 antigens are often found in apparently normal individuals, it appears unlikely that HL-A antigens are the only genetic factors involved in gluten intolerance.

2588 IMMUNOLOGICAL DEFECT IN WHIPPLE'S DISEASE. *(E.)* Groll, A.; Valberg, L. S.; Simon, J. B.; Eidinger, D.; Wilson, B.; Forsdyke, D. R. (Kingston Gen. Hosp., Canada). *Gastroenterology* 63(6):943-950, 1972.

A 47-yr-old man with Whipple's disease was studied to determine whether an immunological defect might accompany or predispose to this rare disorder. By immunoglobulin (Ig) studies and by measuring the antibody response to antigenic stimulation the humoral immune system was evaluated. Ig levels were elevated before treatment, but after successful antibiotic therapy, IgG and IgA fell towards normal and IgM declined to a subnormal level. Intestinal secretions contained both IgA and free secretory component, and all 3 major classes of immunocytes were present in histological sections of the jejunal mucosa. Antibody synthesis to diphtheria antigen was normal, and although the patient could not synthesize antibody to tetanus toxoid during the active phase of the disease, he was able to do so after therapy with tetracycline and ampicillin. Skin tests, ability to reject homografts, and lymphocyte transformation studies were used to assess cell-mediated immunity. Initial cutaneous anergy to histoplasmin and *Candida albicans* remitted with therapy; anergy to tuberculin, trichophyton, and mumps antigen persisted despite clinical remission. In addition, skin homografts from unrelated donors were only slowly rejected, both during the active phase of the disease and remission. Moreover, the patient's lymphocytes *in vitro* demonstrated incorporation of both ^{3}H-thymidine and ^{3}H-uridine in response to phytohemagglutinin (PHA). The defect was partially reversed by the addition of normal serum *in vitro*, whereas the patient's serum blocked the response of normal lymphocytes. This abnormal response to PHA also persisted despite successful treatment of the disease. The patient thus had relatively minor abnormalities of the humoral immune system which largely regressed on antibiotic therapy. In contrast, evidence of impaired cell-mediated immunity persisted during clinical remission of the disease. Whether selective immunological abnormalities predispose to the development of Whipple's disease or the disorder secondarily causes irreversible immune defects remains unclear.

2589 TRANSFERRIN AND STAPHYLOCOCCUS AUREUS IN KWASHIORKOR. *(E.)* McFarlane, H.; Okubadejo, M.; Reddy, S. (Univ. Manchester, England). *Am. J. Clin. Pathol.* 57(5):587-591, 1972.

2590 SMALL INTESTINAL MALABSORPTION. *(E.)* Novis, B. N.; Bank, S.; Marks, I. N. (Univ. Cape Town, Union South Africa). *S. Afr. Med. J.* 46(16):455-462, 1972.

2591 MILK AND LACTOSE INTOLERANCE FOLLOWING DISTAL SMALL BOWEL RESECTION. *(E.)* Wapnick, S. (Ichilov Hosp., Tel Aviv, Israel). *Am. J. Clin. Nutr.* 25(7):655-660, 1972.

2592 BILE ACID MALABSORPTION CAUSED BY ILEAL RESECTION. *(E.)* Hofmann, A. F.; (Mayo Clin., Rochester, Minn.). *Arch. Intern. Med.* 130(4):597-605, 1972.

2593 APPROACH TO THE MALABSORPTION SYNDROMES ASSOCIATED WITH DISORDERED BILE ACID METABOLISM. *(E.)* Wilson, F. A.; Dietschy, J. M. (Univ. Texas Southwestern Med. Sch., Dallas). *Arch. Intern. Med.* 130(4):584-594, 1972.

2594 LACTOSE MALABSORPTION IN FINNISH CHILDREN OF SCHOOL AGE. *(E.)* Sahi, T.; Isokoski, M.; Jussila, J.; Launiala, K. (Univ. Helsinki, Finland). *Acta Paediatr. Scand.* 61(1):11-16, 1972.

2595 THE D-XYLOSE TEST IN THE EXPLORATION OF INTESTINAL ABSORPTION IN DIABETES MELLITUS. *(Sp.)* Aparisi Quereda, L.; Rodrigo Gomez, J. M.; Garcia-Conde Bru, F. J.; Guix Garcia, L.; Palao Esteve, J.; Camps Vilata, B. (Dept. Med. Pathol. B, Valencia, Spain). *Rev. Esp. Enferm. Apar. Dig.* 37(4):409-420, 1972.

2596 THE MALABSORPTION ASSOCIATED WITH CHRONIC LIVER DISEASE IN CHILDREN. *(E.)* Weber, A.; Roy, C. C. (St. Justine Hosp., Univ. Montreal, Canada). *Pediatrics* 50(1):73-83, 1972.

2597 DISAPPEARANCE OF THE ANTI-ANAEMIA LIVER PRINCIPLE FOLLOWING DISTAL RESECTION OF THE SMALL INTESTINE IN PIGS. *(E.)* Petri, S.; Petri, C. (Oresundshopital, Copenhagen, Denmark). *Acta Pathol. Microbiol. Scand.* [*A*] 80(2):207-210, 1972.

2598 MALABSORPTION SYNDROME: CLINICAL FEATURES, PATHOGENESIS, PHYSIOPATHOLOGY, THERAPY. *(It.)* Stocchi, F. (Santo Spirito Inst., Rome, Italy). *Policlinico* [*Prat.*] 79(12):487-511, 1972.

2599 OSTEOMALACIA SECONDARY TO GASTROINTESTINAL DISEASE. *(Ger.)* Atzenhofer-Baumgartner, K. (Provincial Hosp., Salzburg, Austria). *Munch. Med. Wochenschr.* 114(12):542-547, 1972.

2600 DISTURBANCES IN VITAMIN B_{12} ABSORPTION IN PATIENTS WITH CHRONIC HEPATITIS AND HEPATIC CIRRHOSIS. *(Rus.)* Kharat'ian, A. M.; Agzamkhodzhaev, S. M.; Verniaeva, T. I.; Volovoi, V. L. (Tashkent Med. Inst., USSR). *Klin. Med. (Mosk.)* 50(8):112-115, 1972.

2601 WHAT PEDIATRICIANS SHOULD KNOW ABOUT MALABSORPTION, BUT ARE AFRAID TO ASK. *(E.)* Sunshine, P. (no affil.). *Curr. Probl. Pediatr.* 11(8):3-46, 1972.

2602 PYRROLIDONECARBOXYL PEPTIDASE ACTIVITY IN NORMAL INTESTINAL BIOPSIES AND THOSE FROM COELIAC PATIENTS. *(E.)* Woodley, J. F. (Dept. Biochem., Univ. Coll., Galway, Eire). *Clin. Chim. Acta* 42(1):211-213, 1972.

2603 COELIAC DISEASE: A PREMALIGNANT DISEASE? *(E.)* McCarthy, C. F.; Mylotte, M. J. (Regional Hosp., Galway, Eire). *J. Irish Med. Assoc.* 65(10):241-245, 1972.

See also 2274, 2544, 2580, 2961.

LARGE INTESTINE

2604 EFFECT OF DIETARY FIBRE ON STOOLS AND TRANSIT-TIMES, AND ITS ROLE IN THE CAUSATION OF DISEASE. *(E.)* Burkitt, D. P.; Walker, A. R. P.; Painter, N. S. (Med. Res. Counc. External Sci. Staff, London, England). *Lancet* 2(7792):1408-1411, 1972.

The amount of stools passed by 1,209 people in more than 20 countries and the speed of transit of food residues through their intestinal tracts have been studied to see if their stools and gut behavior differed in relation to type of food consumed. The prevalence of certain diseases in various parts of the world was examined in search of a relation between disease and type of stool and fiber content of the local diet. The more refined the diet, the smaller the stool and the slower the passage of of food through the intestine. Diets containing ample fiber produce bulky, soft stools which pass rapidly. There is an inverse relation between daily stool weights and transit times. Appendicitis, diverticular diseases of the colon, and both benign and malignant tumors of the colon and rectum are common in those eating refined foods, regardless of race, and are rare in developing countries where unrefined foods are the norm. In areas where a change from a high- to a low-fiber diet had occurred, those diseases appeared with increasing frequency.

2605 THE DISTRIBUTION OF CANCER WITHIN THE LARGE BOWEL.

(E.) de Jong, U. W.; Day, N. E.; Muir, C. S.; Barclay, T. H. C.; Bras, G.; Foster, F. H.; Jussawalla, D. J.; Kurihara, M.; Linden, G.; Martinez, I.; Payne, P. M.; Pedersen, E.; Ringertz, N.; Shanmugaratnam, T. (Univ. Epidemiol. Biostatistics, I.A.R.C., Lyons, France). *Int. J. Cancer* 10(3):463-477, 1972.

An analysis was made of the distribution of cancer of the anatomical sub-sites of the colon and rectum in Alameda County (California), Bombay, Denmark, Kingston and St. Andrew (Jamaica), Miyagi Prefecture (Japan), New Zealand, Norway, Puerto Rico, Saskatchewan (Canada), Singapore, the South Metropolitan Cancer Registry (SMCR) (England), and Sweden. The highest rates for large bowel cancer were found in North America and New Zealand; the lowest in the East (Japan, Bombay, and Singapore) and the Caribbean, while intermediate rates prevailed in Scandinavia and England. The incidence of large bowel cancer varies by a factor of up to 6. The pattern of sub-site distribution of the cancers throughout the large bowel is similar in areas of high and intermediate risk: i.e., there is a decreasing incidence from ascending colon towards the descending colon with a sharp increase in incidence at the sigmoid colon, the rates for rectum being in turn higher than those for the sigmoid. In low-incidence areas, the general pattern is the same, but there may be a deficit of sigmoid cancers. Denmark has a significant excess of lower rectum cancer, particularly in males. The age-standardized incidence rates for rectum cancer in Denmark are higher than in any of the other areas although the rates for other parts of the large intestine in Denmark are in the intermediate range. With advancing age, the sex ratio for colon cancer generally shows a higher male risk; this male excess is, however, confined to the descending and sigmoid colon. The sex ratios for ascending and transverse colon cancer do not change with advancing age, while those for the sigmoid and, to a lesser extent, the descending colon do. Rectal cancer is commoner in males, the male preponderance becoming more pronounced after 65 yr. For descending, sigmoid, and rectal cancers, incidence increases more steeply with age in males than in females. The incidence-age curves on a log-log scale tend to have a downward curvature for the older age-groups. The slopes for ascending and transverse colon cancer do not differ between the sexes, and their age-incidence curves have an upward curvature, particularly in women. It makes little difference to the incidence rates whether cancers of the rectosigmoid are included in the rectum or the colon. In view of the strong correlation between the sub-site incidences, it is reasonable that all sub-site cancers have a common basic etiology. Transit rates in a variety of risk situations, with particular emphasis on the sigmoid, need to be investigated.

2606 INFUSION CHEMOTHERAPY OF LIVER METASTASES FROM LARGE BOWEL CANCER.

(E.) Cady, B.; Oberfield, R. A. (Lahey Clin. Fdn.). *Lahey Clin. Fdn. Bull.* 21(3):89-95, 1972.

Continuous infusion of 5-fluoro-2'-deoxyuridine (FUDR; 20 mg/day for 3-9 months) into the hepatic artery was used to treat 55 patients with hepatic metastases from colonic cancer. FUDR was discontinued during episodes of hepatic toxicity which usually lasted for 5-10 days and were manifested by malaise, anorexia, and rises in SGOT and serum bilirubin values. These symptoms subsided as soon as FUDR was discontinued and replaced by instillation of distilled water. In addition to 1 patient who extracted his catheter during a psychotic episode postoperatively, 3 patients died after surgery as a result of liver failure. Objective and subjective response to therapy was evaluated 6-10 weeks after discharge from the hospital by means of liver function tests, liver scans, angiography, and physical examination. Of the 51 patients who could be evaluated, 36 (71%) responded clinically to FUDR chemotherapy. Median survival time in the responders was 15.0 months, while that in the 18 clinical failures, including postoperative deaths, was 4.5 months. In general, good responses to therapy were obtained when the liver metastasis replaced less than 25% of the liver, bilirubin levels were elevated, the liver was small, and the patients were asymptomatic or had mild symptoms. Poor response usually occurred in elderly patients or those with ascites or elevated transaminase values (SGOT of more than 80 U). Clinical response appeared to be independent of the dose of FUDR infused and episodes of hepatic toxicity.

2607 RADIOIMMUNOASSAY OF CARCINOEMBRYONIC ANTIGEN IN SERUM OF NORMAL SUBJECTS AND PATIENTS WITH COLONIC CARCINOMA.

(E.) Kleinman, M. S.; Turner, M. D. (Univ. Rochester, Sch. Med. and Dentistry, N.Y.). *Gut* 13(5):390-394, 1972.

The presence of carcinoembryonic antigen (CEA) was investigated in sera from 14 normal subjects and 43 patients with colonic carcinoma. Inhibiting material which behaved in the assay in a similar manner to CEA was found in serum at concentrations below 2.8 ng/ml. Its nature has not so far been established. Of the 43 patients with colonic carcinoma, 38 showed levels of serum CEA in excess of 2.8 ng/ml. The concentration of CEA in serum was correlated with the extent of the disease as classified by a staging procedure: stage A, mucosal tumor not involving the serosa, had a mean serum CEA of 5.9 ng/ml; stage B, tumor involving colonic serosa, 7.5 ng/ml; stage C, tumor with local lymph node involvement, 11.9 ng/ml; and stage D, carcinoma with distant metastases, 16.5 ng/ml. Examination of a small number of specimens of colonic carcinoma and normal colonic mucosa suggested CEA concentration in different adenocarcinomata may vary, and traces of cross-reacting material may be found in some normal mucosa.

2608 RECURRENT REGIONAL ILEITIS AFTER ILEOSTOMY AND COLECTOMY FOR GRANULOMATOUS COLITIS.

(E.) Korelitz, B. I.; Present, D. H.; Alpert, L. I.; Marshak, R. H.; Janowitz, H. D. (Mt. Sinai Sch. Med., City Univ. New York). *N. Engl. J. Med.* 287(3):110-115, 1972.

In 31 patients clinical, radiographic, and pathological evidence of recurrent regional enteritis developed after ileostomy and colectomy for granulomatous colitis (Crohn's disease of the colon). In 24 cases, x-ray examination revealed the nature of the recurrent ileal disease to be: thickening of edematous mucosal pattern (19), narrowing of the lumen (9), mucosal ulceration (6), skip areas (4), dilation proximal to stricture (9), sinus tracts and fistulas (4), cobblestoning (20), pseudodiverticula (1), and inflammatory changes in duodenum and stomach (3). These 31 patients represent at least 46% of all cases of granulomatous colitis treated by ileostomy and colectomy at one institution. Multiple operations were required in 8 patients and 6 had severe nutritional deficiences. This high rate of recurrent disease and its frequently serious clinical course contrast with recent claims that such consequences are infrequent. The need for continued separation of the varieties of inflammatory bowel diseases is stressed.

2609 CARCINOID TUMOR OF RECTUM. *(E.)*

Tiedemann, R. N.; McDivitt, R. M.; Thorbjarnarson, B. (New York Hosp.-Cornell Med. Ctr., N.Y.). *N.Y. State J. Med.* 72(5):559-563, 1972.

Clinical records of 22 cases of rectal carcinoid tumor occurring over 16 yr in 13 females (mean age 52 yr) and 9 males (mean age 59 yr) have been analyzed. Nonspecific gastrointestinal symptoms occurred in 9 patients; only 1 patient had tumor-related symptoms. Of the 22 cases, 18 were discovered on routine proctoscopic examination. Most of the tumors were typically submucosal in location. Associated gastrointestinal conditions were: melanocarcinoma of the anus (1), carcinoma of the pancreas (1), villous adenoma (1), benign adenomatous polyps (6), and peptic ulcer (1). The 2 patients with tumors larger than 2 cm diameter died with widespread metastasis. Tumors 1-2 cm in size (6 patients) were treated by anterior resection (1), wide local excision (4), and excisional biopsy (1). Patients with tumors less than 1 cm in size (14 cases) underwent excision at biopsy (9), wide local excision (2), or segmental resection of the bowel (1); 1 was discovered at autopsy and 1 was removed in the course of another operation.

2610 A CONTROLLED THERAPEUTIC STUDY OF THE IRRITABLE-BOWEL SYNDROME: EFFECT OF DIPHENYLHYDANTOIN.

(E.) Greenbaum, D. S.; Ferguson, R. K.; Kater, L. A.; Kuiper, D. H.; Rosen, L. W. (Coll. Hum. Med., Michigan State Univ., East Lansing). *N. Engl. J. Med.* 288(1):13-16, 1973.

Twelve patients were treated for 20 weeks with 300 mg/day of diphenylhydantoin and with placebo in a randomized double-blind crossover study. Six manifestations scored daily were used as assessment criteria. Psychologic tests were performed. During the test period several of the 12 patients used other therapy: anticholinergics (7), diphenoxylate hydrochloride (3), local application of heat (3), laxatives (2), and enema (1). No significant differences were found between diphenylhydantoin and placebo in symptoms, location of pain, mood, or well-being. There were positive correlations between frequency and severity of pain and disability, but not between frequency, and consistency of stools and pain or disability. These manifestations were strikingly consistent of each patient between biweekly periods. Of 7 patients with the most pain, 6 had abnormal scores of neuroticism. There appears to be a rationale for dealing with psychologic factors as well as gut pain in the syndrome.

2611 LEVELS OF ANXIETY IN COLONIC DISORDERS.

(E.) Esler, M. D.; Goulston, K. J. (John Curtin Sch. Med. Res., Australian Natl. Univ., Canberra City). *N. Engl. J. Med.* 288(1):16-20, 1973.

Levels of anxiety and neuroticism were assessed in patients with the irritable colon syndrome (16 with diarrhea-predominant syndrome and 15 with pain-predominant syndrome). These were compared with levels in 16 patients with ulcerative colitis and 40 general medical patients. Assessment of the level of anxiety was based on psychometric testing with the Institute for Personality and Ability Testing anxiety-scale questionnaire, and on the urinary excretion of epinephrine under stressful conditions. The level of neuroticism was derived from testing with the Eysenck personality inventory. Patients with the irritable colon syndrome who had predominantly diarrhea were significantly more anxious and more neurotic than the control population of general medical patients. Patients with ulcerative colitis, and patients with the irritable colon syndrome who had predominantly abdominal pain, did not differ significantly from the control group in these dimensions of personality. It is suggested that treatment of the underlying psychologic disorder might be of help in diarrhea-predominant irritable colon syndrome.

2612 COLONOFIBEROSCOPY: A NEW AND VALUABLE DIAGNOSTIC MODALITY. *(E.)* Wolff, W. I.; Shinya, H.; Geffen, A.; Ozaktay, S. Z. (Beth Israel Med. Ctr., New York). *Am. J. Surg.* 123(2): 180-184, 1972.

2613 LYMPHOPENIA PRODUCED BY POLYETHLENE-^{32}P STRIPS APPLIED TO THE RABBIT APPENDIX. *(E.)* Hollingsworth, J. W.; Carr, J.; Ford, W. L. (Univ. Kentucky Coll. Med., Lexington). *Cell. Immunol.* 4(4):407-415, 1972.

2614 MEBEVERINE, AN EFFECTIVE AGENT IN THE IRRITABLE COLON SYNDROME. *(E.)* Baume, P. (North Shore Med. Ctr., St. Leonards, New South Wales, Australia). *Aust. N.Z. J. Med.* 2(1):34-36, 1971.

2615 PERFORATED APPENDICITIS: A REVIEW OF 225 CASES. *(E.)* Conquest, H. F.; Coxe, III, J. W. (McGuire Clin., Richmond, Va.). *Va. Med. Mon.* 99(7):737-742, 1972.

2616 CLINICAL DIAGNOSIS OF THE IRRITABLE COLON SYNDROME. *(E.)* Goulston, K. (Canberra Hosp., Australia). *Med. J. Aust.* 1(22):1122-1125, 1972.

2617 FAMILIAL MIDGUT VOLVULUS. *(E.)* Smith, S. L. (Lutheran Hosp., Wheatridge, Colo.). *Surgery* 72(3):420-426, 1972.

2618 COMPLICATIONS OF COMBAT CASUALTIES WITH COMBINED INJURIES OF BONE AND BOWEL: PERSONAL EXPERIENCE WITH NINETEEN PATIENTS. *(E.)* Christy, J. P. (U.S. Army Hosp., Camp Zama, Japan). *Surgery* 71(2):270-274, 1972.

2619 THE BLEEDING CECAL ULCER: PATHOGENESIS, ANGIOGRAPHIC DIAGNOSIS, AND NONOPERATIVE CONTROL. *(E.)* Sutherland, D.; Frech, R. S.; Weil, R.; Najarian, J. S.; Simmons, R. L. (Dept. Surgery, Univ. Minnesota, Minneapolis). *Surgery* 71(2): 290-294, 1972.

2620 PAPILLARY (VILLOUS) ADENOMAS OF THE COLON AND RECTUM. *(E.)* Orringer, M. B.; Eggleston, J. C. (Johns Hopkins Hosp., Baltimore, Md.). *Surgery* 72(3):378-387, 1972.

2621 THE TRANSSPHINCTERIC APPROACH TO MID AND LOW RECTAL VILLOUS ADENOMA: ANATOMIC BASIS OF SURGICAL TREATMENT. *(E.)* Oh, C.; Kark, A. E. (Mt. Sinai Sch. Med., New York, N.Y.). *Ann. Surg.* 176(5):605-612, 1972.

2622 CHOLESTEROL EMBOLIZATION TO THE CECUM WITH BOWEL INFARCTION. *(E.)* Carnevale, N. J.; Delany, H. M. (Morrisania City Hosp., Bronx, N.Y.). *Arch. Surg.* 106(1):94-96, 1973.

2623 EXTERIORIZED PRIMARY REPAIR OF COLON INJURIES. *(E.)* Okies, J. E.; Bricker, D. L.; Jordan, G. L.; Beall, Jr., A. C.; Debakey, M. E. (Baylor Coll. Med., Houston, Tex.). *Am. J. Surg.* 124(6):807-810, 1972.

2624 TOTAL COLON AGANGLIONOSIS: REPORT OF NINE CASES. *(E.)* Asch, M. J.; Weitzman, J. J.; Hays, D. M.; Brennan, L. P. (Children's Hosp., Los Angeles, Calif.). *Arch. Surg.* 105(1): 74-78, 1972.

2625 DIFFERENTIAL DIAGNOSIS OF "ACUTE APPENDICITIS". TORSION OF AN EPIPLOIC APPENDIX. *(Ger.)* Endmann, P. (Surg. Clin., Friedrich Schiller Univ., Jena, Germany). *Zentralbl. Chir.* 97(26):895-896, 1972.

2626 VOLVULUS OF THE SIGMOID COLON. *(E.)* Patalay, V. E. (Osmania Gen. Hosp., Hyderabad, India). *Indian J. Surg.* 34(4):157-163, 1972.

2627 SURGICAL INDICATIONS FOR DIVERTICULAR DISEASE OF THE COLON. *(Sp.)* Etala, E. (Alvear Hosp., Buenos Aires, Argentina). *Prensa Med. Argent.* 59(11):411-415, 1972.

2628 METASTATIC CARCINOMA OF THE APPENDIX: REPORT OF A CASE. *(E.)* Zelikowski, A.; Urca, I. (Beilinson Hosp., Petach Tiqva, Israel). *Dis. Colon Rectum* 15(4):305-307, 1972.

2629 LEFT COLON ISCHEMIA COMPLICATING AORTO-ILIAC RECONSTRUCTION: CAUSES, DIAGNOSIS, MANAGEMENT, AND PREVENTION. *(E.)* Ottinger, L. W.; Darling, R. C.; Nathan, M. J.; Linton, R. R. (Harvard Med. Sch., Boston, Mass.). *Arch. Surg.* 105(6):841-846, 1972.

2630 INSUFFLATION INJURY OF THE BOWEL. *(E.)* Rosenberg, I. L.; Smiddy, F. G. (Leeds Gen. Infirm., England). *Arch. Surg.* 105(1):113-115, 1972.

2631 INGUINAL HERNIA AND COLORECTAL CARCINOMA. *(E.)* Juler, G. L.; Stemmer, E. A.; Fullerman, R. W. (Long Beach Veterans Hosp., Calif.). *Arch. Surg.* 104(6):778-780, 1972.

2632 MESENTERIC FIBROMATOSIS FOLLOWING COLECTOMY FOR FAMILIAL POLYPOSIS. *(E.)* Chanco, Jr., A. G.; Rose, E. F. (Coll. Med., Univ. Iowa, Iowa City). *Arch. Surg.* 104(6):851-852, 1972.

2633 DIVERTICULAR DISEASE IN THE TRANSPOSED COLON USED FOR ESOPHAGOPLASTY: REPORT OF TWO CASES. *(E.)* Raia, A.; Habr Gama, A.; Pinotti, H. W.; Gama Rodrigues, J. J. (Clin. Hosp., Fac. Med., Univ. Sao Paulo, Brazil). *Ann. Surg.* 177(1):70-74, 1973.

2634 COLONIC RETENTION OF BARIUM IN THE ELDERLY AFTER BARIUM-MEAL EXAMINATION AND ITS TREATMENT WITH LACTULOSE. *(E.)* Prout, B. J.; Datta, S. B.; Wilson, T. S. (Roy. Cornwall Hosp., Treliske, Truro, England). *Br. Med. J.* 4(5839):530-533, 1972.

2635 PROCTOLOGICAL PROBLEMS IN EVERYDAY PRACTICE. *(Ger.)* Knoch, H. G.: Kamenz. E. (Carl Gustav Carus Med. Acad., Dresden, Germany). *Dtsch. Gesundheitsw.* 27(26):1201-1209, 1972.

2636 IMMUNOLOGICAL DIFFERENCES BETWEEN RECTAL CANCER ANTIGEN AND RECTAL NORMAL ANTIGEN. XIV. AN INVESTIGATION OF CANCER SPECIFIC ANTIGEN. *(Jap.)* Aoki, N. (Hirosaki Univ. Sch. Med., Japan). *Hirosaki Med. J.* 23(4):491-514, 1972.

2637 SPONTANEOUS RUPTURE OF THE SIGMOID WITH SUBSEQUENT PROLAPSE OF THE SMALL INTESTINE THROUGH THE RECTUM. *(Pol.)* Prokop, M. (Munic. Hosp., Starachowice, Poland). *Pol. Przegl. Chir.* 44(8):1381-1383, 1972.

2638 TORSION OF THE CECUM AND ASCENDING COLON. *(Pol.)* Zalewski, H. (Pomeranian Acad. Med., Szczecin, Poland). *Pol. Przegl. Chir.* 44(8):1385-1387, 1972.

2639 A CASE OF CROHN'S DISEASE OF THE COLON ASSOCIATED WITH ADENOCARCINOMA EXTENDING FROM CARDIA TO THE ANUS. *(E.)* Clemmemsem, T.; Johansen, A. (Bispebjerg, Hosp., Copenhagen, Denmark). *Acta Pathol. Microbiol. Scand.* [*A*] 80(1):5-8, 1972.

2640 VILLOUS ADENOMA: A REVIEW. *(E.)* Zeskind, H. J. (Mt. Carmel-Mercy Hosp., Detroit, Mich.). *Mich. Med.* 71(20):615-617, 1972.

2641 BACTERIA THAT STICK IN THE GUT. *(E.)* Fuller, R. (Natl. Inst. Res. Dairying, Shinfield, England). *New Scientist* 56(822):806-807, 1972.

2642 DRUG USAGE IN THE IRRITABLE COLON SYNDROME. *(E.)* Goulston, K. (Canberra Hosp., Australia). *Med. J. Aust.* 1:1126-1131, 1972.

2643 CROHN'S DISEASE OF THE ANAL REGION. *(E.)* McKay, J. L.; McMahon, W. A. (no affil.). *Northwest Med.* 71(2):111-112, 1972.

2644 DUHAMEL OPERATION IN THE ADULT: REPORT OF ELEVEN CASES. *(E.)* Dubra, C. C.; Repetto, L. M. (Clin. Hosp., Buenos Aires, Argentina). *Am. J. Proctol.* 23(3):205-208, 1972.

2645 RECTAL AND COLONIC ULCERATION IN BEHCET'S DISEASE. *(E.)* Empey, D. W. (London Hosp., England). *Br. J. Surg.* 59(3):173-175, 1972.

2646 RECTAL BLEEDING IN CROHN'S DISEASE OF THE COLON. *(E.)* Bandler, M. (Jewish Hosp. Med. Ctr., Brooklyn, N.Y.). *N.Y. State J. Med.* 72(12):1585-1591, 1972.

2647 SHIGELLOSIS ASSOCIATED WITH APPENDICITIS. *(E.)* Sanders, D. Y.; Cort, C. R.; Stubbs, A. J. (Bowman Gray Sch. Med., Winston-Salem, N. C.). *J. Pediatr. Surg.* 7(3):315-317, 1972.

2648 CANCER OF THE COLON. *(Sp.)* Ledesma, E. M. (no affil.). *Hispalis Med.* 29(335):351-360, 1972.

2649 SOME CASES OF LOW, EXTERNAL GASTROINTESTINAL FISTULAS. *(Fr.)* Meyer, J.; Otte, J. B. (St. Pierre Clin., Univ. Louvain, Belgium). *Louvain Med.* 91(5):255-259, 1972.

2650 TREATMENT OF COLITIS. *(It.)* Teodori, U. (Med. Clin., Univ. Florence, Italy). *Clin. Ter.* 60(2, pt. II):1-10, 1971.

2651 PRIMARY LYMPHORETICULOSARCOMAS OF THE COLON: TWO CASES. *(Fr.)* Combe, J.; Runser, C.; Gillet, M.; Milleret, P. (Univ. Hosp. Ctr., Besancon, France). *Cah. Med.* 13(8):575-581, 1972.

2652 SELF-REHABILITATION AFTER GASTROINTESTINAL STOMA. *(Heb.)* Eschar, J.; Wishnitzer, T. (Assaf Harofeh Govt. Hosp., Tel Aviv, Israel). *Harefuah* 82(2):490-491, 1972.

2653 INTESTINAL PERFORATION FOLLOWING EXCHANGE TRANSFUSION. *(E.)* Hardy, J. D.; Savage, T. R.; Shirodaria, C. (Addenbrooke's Hosp., Cambridge, England). *Am. J. Dis. Child.*]24(1):136-141, 1972.

2654 LYMPH NODE REMOVAL IN THE TREATMENT OF CANCERS OF THE LEFT COLON AND UPPER RECTUM. *(Fr.)* Fernoux, H. (Sainte-Marie Clin., Chalon-sur-Saone, France). *Ann. Chir.* 26(9/10):515-519, 1972.

2655 POLYPS OF THE COLON. THE VALUE OF THEIR DETECTION AND IDENTIFICATION WITH COLONOSCOPY. *(Fr.)* Cornet, A.; Barrier, J. P.; Carayon, P.; Carnot, F.; Marche, J.; Marche, C. (Laennec Hosp., Paris, France). *Sem. Hop. Paris* 27(28):1844-1850, 1971.

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2657 RARE CASE OF ENDOMETRIOSIS OF THE VAGINO-RECTAL SEPTUM. *(Pol.)* Nikodem, W. (Madurowicz Munic. Hosp. Obstet. Gynec., Wroclaw, Poland). *Pol. Tyg. Lek.* 27(37):1447-1448, 1972.

2658 COLOMYOTOMY: A NEW APPROACH TO SURGERY FOR COLONIC DIVERTICULAR DISEASE. *(E.)* Ranson, J. H. C.; Lawrence, L. R.; Localio, S. A. (New York Univ. Med. Sch., N.Y.). *Am. J. Surg.* 123(2):185-191, 1972.

2659 ACUTE APPENDICITIS IN INGUINAL HERNIA. *(Pol.)* Kompf, A.; Napierala, M.; Aniszczenko, J. (Acad. Med., Poznan, Poland). *Pol. Przegl. Chir.* 44(8):1379-1380, 1972.

2660 ANAL FISSURE. *(Fr.)* Ceulemans, G.; van Baden, M. (St. Josef Clin., Mortsel, Belgium). *Acta Chir. Belg.* 71(1):61-66, 1972.

2661 COMPLICATIONS OF APPENDICITIS IN CHILDREN. *(Ger.)* Mothes, W.; Mehl, H. J. (Regional Hosp., Stralsund, Germany). *Zentralbl. Chir.* 97(23):772-779, 1972.

2662 CRITICAL REMARKS ON THE CONCEPT OF IRRITABLE COLON. *(Ger.)* Eisner, M. (Med. Clin., Univ. Basel, Switzerland). *Dtsch. Med. Wochenschr.* 97(15):616-617, 1972.

2663 FACTORS IN THE PROGNOSIS OF ADENOCARCINOMA OF THE COLON AND RECTUM. *(E.)* Sanfelippo, P. M.; Beahrs, O. H. (Mayo Clin., Rochester, Minn.). *Arch. Surg.* 104(4):401-406, 1972.

2664 TRANS-SACRAL REPAIR OF RECTAL PROLAPSE: EFFICACY OF TREATMENT IN THIRTY CONSECUTIVE PATIENTS. *(E.)* Davidian, Jr., V. A.; Thomas, Jr., C. G. (Univ. North Carolina Sch. Med., Chapel Hill). *Am. J. Surg.* 123(2):231-235, 1972.

2665 MYXOGLOBULOSIS OF THE APPENDIX: REPORT OF TWO CASES. *(E.)* Lubin, J.; Berle, E. (Mt. Sinai Med. Ctr., Miami Beach, Fla.). *Arch. Pathol.* 94(6):533-536, 1972.

2666 POLYPS OF THE LARGE INTESTINE. *(Pol.)* Tobik, S.; Bogdanowski, T.; Moskal, M. (Silesian Acad. Med., Katowice, Poland). *Pol. Przegl. Chir.* 44(7):1191-1195, 1972.

2667 UNUSUAL CAUSE OF MASSIVE FATAL BLEEDING FROM THE LARGE INTESTINE. *(Ger.)* Niedobitek, C.; Niedobitek, F. (Med. Acad., Lubeck, Germany). *Zentralbl. Allg. Pathol.* 115(5):614-617, 1972.

2668 CLOACOGENIC CARCINOMA OF THE ANAL CANAL. *(E.)* Kheir, S.; Hickey, R. C.; Martin, R. G.; MacKay, B.; Gallager, H. S. (Univ. Texas, Houston). *Arch. Surg.* 104(4):407-415, 1972.

2669 ARTERIOVENOUS MALFORMATION OF THE INTESTINE: AN UNCOMMON CAUSE OF GASTROINTESTINAL BLEEDING. *(E.)* Cooperman, A. M.; Kelly, K. A.; Bernatz, P. E.; Huizenga, K. A. (Mayo Clin., Rochester, Minn.). *Arch. Surg.* 104(3):284-291, 1972.

2670 DEVELOPMENT OF RIGHT INGUINAL HERNIA FOLLOWING APPENDICECTOMY: A 10-YEAR REVIEW OF CASES. *(E.)* Gue, S. (Worcester,Roy. Infirm., England). *Br. J. Surg.* 59(5):352-353, 1972.

2671 CONSERVATIVE TREATMENT OF CROHN'S DISEASE OF THE LARGE INTESTINE. *(Ger.)* Stalder, G. A.; Kayasseh, L. (Med. Polyclin., Univ. Basel, Switzerland). *Praxis* 61(1):20-22, 1972.

2672 DOES SQUAMOUS CARCINOMA OF THE COLON EXIST? *(E.)* Balfour, T. W. (Western Gen. Hosp., Edinburgh, Scotland). *Br. J. Surg.* 59(5):410-412, 1972.

2673 TO THE MANAGEMENT OF THE VOLVULUS OF THE SIGMOID. *(E.)* Polivka, J. A. (no affil.). *J. Abdominal Surg.* 14(7):131-132, 1972.

2674 PERIAPPENDICITIS. *(Ger.)* Schulz, M. R.; Krafft, L. (Regional Hosp., Brandenburg, Germany). *Zentralbl. Chir.* 97(26):873-878, 1972.

See also 2061, 2227, 2264, 2265, 2267, 2283, 2285, 2288, 2298, 2311, 2332, 2370, 2508, 2527, 2530, 2535, 2550, 2563, 2570, 2575, 2579, 2586, 2682, 2693, 2727, 2883, 2891, 2898, 2908, 2926, 2956.

LARGE INTESTINE

Ulcerative Colitis

2675 ULCERATIVE COLITIS TREATED BY ILEOSTOMY AND EXCISIONAL SURGERY: FIFTEEN YEARS' EXPERIENCE AT ST. MARK'S HOSPITAL. *(E.)* Ritchie, J. K. (St. Mark's Hosp., London, England). *Br. J. Surg.* 59(7):345-351, 1972.

The results of excisional surgery with the establishment of a permanent ileostomy in 246 patients (120 male, 126 female; mean age 40.7 yr) with ulcerative colitis operated on in the years 1955-69 are presented. Other diseases occurring preoperatively included: peptic ulcer (4), gallstones (3), urolithiasis (5), and diabetes mellitis (5). The overall mortality of the primary surgery was 8.1%, (9.3% in 1955-9, 10.6% in 1960-4, and 5.3% in 1965-9). This mortality was 1.6% in 128 patients treated electively, 10.7% in 75 cases coming to urgent surgery, and 23.3% in 43 patients undergoing emergency operations. The mortality in this third group fell from 36.4% in 1955-9 to 25% in 1960-4 and 15% in 1965-9. The incidence of major postoperative complications for patients treated by total proctocolectomy or colectomy and ileostomy was also clearly related to the preoperative severity of the disease, being 18.8% in the elective cases, 31.3% in the urgent cases, and 40% in the emergency cases. With the exception of intestinal obstruction requiring surgery, late complications of surgery were infrequent in this series and showed a marked decrease in the last 5 yr of the study. With the possible exception of urolithiasis, this investigation revealed no increased susceptibility to diseases or conditions of a general nature in the long-term study of these patients (average length of follow-up 7 yr) and emphasized the excellent life expectancy in patients who underwent radical surgery in the absence of malignant change.

2676 COLECTOMY IN CHILDREN WITH ULCERATIVE AND GRANULOMATOUS COLITIS: OPERATIVE INDICATIONS AND RESULTS. *(E.)* Frey, C. F.; Weaver, D. K. (Dept. Surg., Univ. Michigan, Ann Arbor). *Arch. Surg.* 104(4):416-423, 1972.

Seventy-five children, below 16 yr of age, 15 with granulomatous and 60 with ulcerative colitis, were treated by a multidiscipinary team between 1961 and 1970. The overall mortality was 9%. Of these children, 53 underwent colectomy: 41 had ulcerative and 12 granulomatous colitis. Disease was confined to the colon in 33 of the 41 with ulcerative colitis and in 4 of the 12 with granulomatous colitis. Indications for surgery included toxic dilatation of the colon, massive melena, and impaired growth. Toxic dilatation of the colon, difficult to identify, resulted in 3 of 5 deaths caused by failure to remove the colon promptly. Impaired growth, as measured by height and weight, was responsible for colectomy in 17 children with ulcerative and 6 with granulomatous colitis. Postoperatively, the height and weight distribution of 37 surviving children with ulcerative colitis returned almost to normal. Of 12 children with granulomatous colitis, 3 failed to develop an improved pattern of growth after surgery.

2677 ALTERATIONS IN SERUM IMMUNOGLOBULINS AFTER RESECTION FOR ULCERATIVE AND GRANULOMATOUS DISEASE OF THE INTESTINE. *(E.)* Gelernt, I. M.; Present, D. H.; Janowitz, H. D. (Mt. Sinai Sch. of Med., City Univ. of New York). *Gut* 13:21-23, 1972.

Four groups of patients were studied: group I was 14 patients with granulomatous disease of the bowel having resections of the diseased segment; group II, 6 patients, resections of colon for ulcerative colitis; group III, 4 patients, bypass of diseased segment for granulomatous disease of the bowel; and group IV, 16 control patients, gastrointestinal resections for diverticulitis, carcinoma, or peptic ulcer. Following resections for ulcerative colitis and granulomatous enteritis there was a significant rise in serum IgM levels. The rise seen in IgM following resection did not occur after bypass surgery. No consistent changes were noted in the concentrations of IgA or IgG. There was no observed difference noted between patients with ulcerative colitis and granulomatous enteritis in the IgM response following resection. The results resemble those which occur after the surgical removal of an allograft which is in process of being rejected.

2678 ULCERATIVE COLITIS: A CLINICAL STUDY OF 399 PATIENTS. *(E.)* Jalan, K. N.; Prestcott, R. J.; Sircus, W.; Card, W. I.; McManus, J. P. A.; Falconer, C. W. A.; Small, W. P.; Smith, A. N.; Bruce, J. (Western Gen. Hosp., Edinburgh, Scotland). *J. R. Coll. Surg. Edinb.* 16(6):338-351, 1971.

The clinical features of 399 patients with ulcerative colitis representing the total experience of this disease over 18 yr in a Gastro-Intestinal Unit offering joint medical and surgical care have been examined. Changes in the character of disease during the period of study were sought and, apart from fluctuation in the earlier yr, none was found. The overall male: female ratio was 1:1.5 and the overall age incidence of onset was 80% between 15-49 yr, 15% for over 50 yr, and 5% for less than 15 yr. The blood group distribution and marital status of the patients with ulcerative colitis was similar to those of the local population. The severity of disease was found to be related to the extent of involvement, attack state, and mode of onset. The incidence of ulcerative colitis in the first degree relatives of the patients (16 of 399 patients) was higher than expected. A new method of classifying severity of disease has been presented which uses the number of bowel movements, erythrocyte sedimentation rate, and temperature as variables.

2679 THE EPIDEMIOLOGIC AND DEMOGRAPHIC CHARACTERISTICS OF INFLAMMATORY BOWEL DISEASE: AN ANALYSIS OF A COMPUTERIZED FILE OF 1400 PATIENTS. *(E.)* Roger, B. H. G.; Clark, L. M.; Kirsner, J. B. (Dept. Med., Univ. Chicago, Ill.). *J. Chronic Dis.* 24(12):743-773, 1971.

Epidemiologic and demographic data from approximately 1400 patients with inflammatory bowel disease was analyzed by computer. The patients in this study had a peak age of onset earlier than in previously reported studies. For ulcerative colitis, regional enteritis and ileocolitis, the peak age of onset was 16-20 yr, and for granulomatous colitis, 21-25 yr. Caucasians were primarily affected by Crohn's disease and ulcerative colitis. The sex ratio was about 1:1 for both ulcerative colitis and granulomatous colitis. There was a predominance of males in the regional enteritis and ileocolitis groups. There was a lower than expected percentage of patients with inflammatory bowel disease among farmers. The larger than expected percentage of unmarried subjects in this study may reflect the early age of onset of inflammatory bowel disease and social attitudes related to the chronicity and invalidism imposed by these disorders. A greater than expected number of patients were Jewish. As noted in other studies, a superior educational achievement characterized this patient group.

2680 COLONIC LYMPHOMA IN ULCERATIVE COLITIS: REPORT OF FOUR CASES. *(E.)* Nugent, F. W.; Zuberi, S.; Bulan, M. B.; Legg, M. A. (New Engl. Deaconess Hosp., Boston, Mass.). *Lahey Clin. Found. Bull.* 21(3):104-111, 1972.

2681 ILEORECTOSTOMY FOR ULCERATIVE DISEASE OF THE COLON. *(E.)* Adson, M. A.; Cooperman, A. M.; Farrow, G. M. (Mayo Clin., Rochester, Minn.). *Arch. Surg.* 104(4):424-428, 1972.

2682 TOXIC MAGACOLON. *(E.)* Abrams, B. L.; Waterman, N. G. (Univ. Louisville Sch. Med., Kentucky). *J. Ky. Med. Assoc.* 70(7):529-532, 1972.

2683 THE PROBLEM OF CHRONIC INFLAMMATORY BOWEL DISEASE. *(E.)* Watson, D. W. (Dept. Med., Univ. California, Davis). *Calif. Med.* 117(1):25-41, 1972.

2684 DIFFERENTIATING ULCERATIVE COLITIS AND TRANSMURAL COLITIS. *(E.)* Farmer, R. G. (Cleveland Clin. Fdn., Ohio). *Fam. Physician* 5(5):78-84, 1971.

See also 2571, 2650, 2880.

PANCREAS

2685 OBSERVATIONS ON CYSTIC FIBROSIS OF THE PANCREAS: THE APOCRINE GLAND. *(E.)* Esterly, N. B.; Oppenheimer, E. H.; Esterly, J. R. (Chicago Lying-In Hosp., Ill.). *Am. J. Dis. Child.* 123(3):200-203, 1972.

Dilatation of apocrine glands with retained mucin secretions was found in nearly 1/3 of 54 autopsied patients with cystic fibrosis. The changes were most severe and frequent (8 of 13) in children over 7 yr; 7 of the 8 were girls. Less marked alterations were significantly less common in a control group of 57 unaffected infants and children. Histochemical techniques were used to demonstrate the presence of neutral and acid mucopolysaccharides, including both sulfomucins and carboxymucins. No qualitative difference in staining reactions was detected between patients with cystic fibrosis and control cases. Since apocrine dilatation is an apparent normal variant in the adult, this change may be interpreted as a precocious phenomenon and another demonstration of the altered biology of cystic fibrosis. The predominance in girls over the age of 7 suggests the influence of prepubertal

ndocrine changes, but this study gave no evidence
o support this hypothesis.

686 LIVER SCANNING AND LIVER FUNCTION
IN CYSTIC FIBROSIS. *(E.)* Feigelson, J.;
ecau, Y.; Perez, R. (no affil.). *Acta Paediatr.*
cand. 61(3):337-342, 1972.

he liver in 25 patients (7 male, 18 female, aged
-17 yr) with cystic fibrosis was examined by means
f isotope scanning, standard liver function tests,
nd x-rays of the esophagus. Only 3 patients had
normal liver scintiscan. Hepatomegaly with
omogeneous distribution of the isotope was
vident in 13 patients, hepatomegaly and heter-
eneous distribution in 4, signs of extrahepatic
ptake in 6. In this last group, 2 patients
ad definite signs of cirrhosis of the liver
ith portal hypertension, hypersplenism, and one
ad gastrointestinal hemorrhages; 4 had severe
hronic pulmonary symptoms. Two of these patients
ied and examination of their liver did not
how cirrhosis but rather focal biliary fibrosis.
iver scanning confirmed data obtained through
linical, biochemical, and radiological examination,
ermitting adequate visualization of the liver
nd the isotope.

687 STUDIES ON THE POTENTIAL ROLE OF SECRETIN
IN THE ISLET CELL TUMOR DIARRHEOGENIC
NDROME. *(E.)* Sanzenbacher, L. J.; Mekhjian, H.
.; King, D. R.; Zollinger, R. M. (Ohio State Univ.
oll. Med., Columbus). *Ann. Surg.* 176(3):394-402,
972.

688 NEONATAL JAUNDICE ASSOCIATED WITH CYSTIC
FIBROSIS. *(E.)* Taylor, W. F.; Qaqundah,
. Y. (Univ. California, Irvine). *Am. J. Dis. Child.*
23(2):161-162, 1972.

589 TREATMENT OF PANCREATOLITHIASIS BY
PANCREATICOJEJUNOSTOMY. *(Ger.)* Grill,
. (Regional Hosp., Starnberg/See, Germany).
tuelle Chir. 7(4):233-238, 1972.

590 ANNULAR INCOMPLETE PANCREAS. (TWO CASES).
(Gr.) Papadimitriou, T.; Mayrogeorges, G.
urg. Clin., Thessalonika, Greece). *Galenus*
(3):321-336, 1972.

591 ADENOMA OF THE HEAD OF THE PANCREAS
ASSOCIATED WITH A CARCINOMA OF THE TAIL
THE PANCREAS. *(Ger.)* Briebsch, G. (St. Georg
gional Hosp., Leipzig, Germany). *Zentralbl.*
lg. Pathol. 115(5):511-516, 1972.

2692 CLOSED TRAUMATIC INJURIES TO THE PANCREAS. *(Pol.)* Chwialkowski, J.; Przedpelski, S.; Szaroszyk, J. (Munic. Hosp., Plock, Poland). *Pol. Przegl. Chir.* 44(8):1363-1367, 1972.

2693 INTESTINAL AND PANCREATIC INVOLVEMENT IN SJOGREN'S SYNDROME. *(Por.)* Moraes, Jr., J. P. P.; Acras, S.; Neves, D. P.; Bettarello, A. (Fac. Med., Univ. Sao Paulo, Brazil). *Arq. Gastroenterol.* 9(1):11-16, 1972.

2694 "BIG" INSULIN AND THE TREATMENT OF AN ISLET CELL CARCINOMA WITH STREPTOZOTOCIN. *(E.)* Pearson, M. J.; Larkins, R. G.; Martin, F. I. R. (Roy. Melbourne Hosp., Australia). *Metabolism* 21(6): 551-558, 1972.

2695 DISAPPEARANCE OF DISSEMINATED PANCREATIC CARCINOMA WITH COMBINED CHEMOTHERAPY. *(E.)* Lokich, J. J.; Brooks, J. R. (Peter Bent Brigham Hosp., Boston, Mass.). *Ann. Surg.* 177(1): 13-14, 1973.

2696 PANCREATIC TRAUMA: A REVIEW. *(E.)* Northrup, III, W. F.; Simmons, R. L. (Univ. Minnesota Health Sci. Ctr., Minneapolis). *Surgery* 71(1):27-43, 1972.

2697 MEDIASTINAL ENTERIC SEQUESTRATION WITH ABERRANT PANCREAS: A FORMES FRUSTES OF THE INTRALOBAR SEQUESTRATION. *(E.)* Tilson, M. D.; Touloukian, R. J. (Yale Univ. Sch. Med., New Haven, Conn.). *Ann. Surg.* 176:669-671, 1972.

2698 PANCREATIC ABSCESSES. *(E.)* Warshaw, A. L. (Massachusetts Gen. Hosp., Boston). *N. Engl. J. Med.* 287(24):1234-1236, 1972.

2699 PANCREATIC ENZYME REPLACEMENT IN THE TREATMENT OF CYSTIC FIBROSIS. *(E.)* Anderson, C. M. (Inst. Child Health, Birmingham, England). *Prescribers J.* 12(2):45-49, 1972.

2700 PANCREATIC HETEROTOPIA. *(Sp.)* Mir Pallardo, J.; Munoz Ibanez, M.; Sendra Leon, P.; Munoz Gomez, C. (La Fe Munic. Sanitorium, Valencia, Spain). *Med. Esp.* 67(397):259-264, 1972.

2701 CYSTIC FIBROSIS OF THE PANCREAS AND CYTOMEGALY. *(Rum.)* Anghelescu, V.; Cighir, R. (Children's Hosp., Galati, Rumania). *Pediatria (Bucharest)* 21(1):15-21, 1972.

2702 CASE REPORT OF PARTIAL DUODENAL OBSTRUCTION DUE TO ANNULAR PANCREAS. *(Gr.)* Keramidas, D.; Skondras, K.; Voyatzis, N. (no affil.). *Iatriki* 20(5):443-446, 1971.

2703 DIAGNOSIS AND TREATMENT OF EXOCRINE PANCREATIC INSUFFICIENCY IN MUCOVISCIDOSIS. *(Ger.)* Shmerling, D. H. (Children's Hosp., Zurich, Switzerland). *Z. Allgemeinmed.* 48(24):1080-1084, 1972.

See also 2231, 2233, 2243, 2245, 2250, 2276, 2279, 2415, 2475, 2711, 2715, 2722, 2825, 2942.

PANCREAS

Pancreatitis

2704 ACTION OF BILE PHOSPHOLIPIDS ON THE PANCREAS. *(E.)* Poncelet, P.; Thompson, A. G. (Montreal Gen. Hosp., Montreal, Quebec, Canada). *Am. J. Surg.* 123(2):196-200, 1972.

Physiologic amounts of lysolecithins were infused for 30-60 min at low pressure into the pancreatic duct of male Wistar rats. The rats were sacrificed 1-4 days later. In 16 rats 6-10 mg/ml lysolecithin produced necrosis and hemorrhage in the gland. The presence of sodium cholate, bilirubin, mucoproteins or blood proteins in 60 rats did not suppress this toxic potential. When infused in equal concentration with lecithin or in solution in diluted gallbladder bile, lysolecithin was harmless. A synergistic action with trypsin exists and can result in pancreatic cell destruction at very low concentrations of lysolecithin (10 mg/ml) or lecithin (1 mg/ml).

2705 ESTROGEN-INDUCED PANCREATITIS IN PATIENTS WITH PREVIOUSLY COVERT FAMILIAL TYPE V HYPERLIPOPROTEINEMIA. *(E.)* Glueck, C. J.; Scheel, D.; Fishback, J.; Steiner, P. (Univ. Cincinnati Coll. Med., Cincinnati Gen. Hosp., Ohio). *Metabolism* 21(7):657-666, 1972.

When pancreatitis followed 1-2 yr after postmenopausal (3 females) and postprostatectomy (1 male) estrogen administration, previously hidden familial Type V hyperlipoproteinemia became apparent. The 3 women had long-standing hypertension and had been taking various thiazide diuretics for 3 or more yr prior to estrogen therapy. Cholecystectomy had been performed on 2 of the women 12 and 14 yr earlier. No gastric or duodenal ulcer symptoms were present. Kindred screening revealed one family with Type V hyperlipoproteinemia in a son and at least one relative in each family with Type IV hyperlipoproteinemia. Exogenous and endogenous hypertriglyceridemia were severely exacerbated, carbohydrate tolerance worsened, and activity of postheparin lipolytic enzymes were depressed by estrogen therapy. Amelioration of pancreatitis, decreases in hyperglyceridemia and hyperglycemia, and increments in postheparin lipolytic activities followed cessation of estrogens.

2706 PANCREATITIS AFTER RENAL TRANSPLANTATION. *(E.)* Renning, J. A.; Warden, G. D.; Stevens, L. E.; Reemtsma, K. (St. Luke's Hosp. Ctr., New York, N.Y.). *Am. J. Surg.* 123(3):293-296, 1972.

In a series of 86 renal allotransplants 5 cases of fatal pancreatitis developed. Pancreatitis after renal transplantation may be caused by steroid medication, hyperparathyroidism, surgical trauma to the pancreas, autorejection, or viral pancreatitis. The traditional abdominal findings of pancreatitis can be masked by steroid therapy. Therefore early detection, appropriate standard treatment, and reduction of steroids are the best steps now available to improve patient survival.

2707 HEMORRHAGIC PANCREATITIS. *(E.)* Jordan, Jr., G. L.; Spjut, H. J. (Baylor Coll. Med., Houston, Tex.). *Arch. Surg.* 104(4):489-493, 1972.

Pancreatitis associated with gross retroperitoneal or i.p. hemorrhage occurred in 51 patients (age 26-73 yr) treated during 20 yr. Hemorrhagic pancreatitis was the first manifestation of disease of these 51 patients. Hypocalcemia was noted in 13 of 19 patients on whom serum calcium determinations were run. In 23 patients whose serum bilirubin concentration was determined, 15 were above normal. No patient treated medically survived, while among 21 patients treated operatively, 9 survived. Operations performed on the survivors included drainage only (10), cholecystostomy (4), or merely exploratory laparotomy (4), cholecystectomy and exploration of the common bile duct (1), gastrectomy and feeding jejunostomy (1), and drainage of abscess (1). Surgery is recommended when complications occur and there is evidence of gross hemorrhage in patients with pancreatitis.

2708 INTRASPLENIC DISSECTION BY PANCREATIC PSEUDOCYSTS. *(E.)* Warshaw, A. L.; Chesney, T. M.; Evans, G. W.; McCarthy, H. F. (Massachusetts Gen. Hosp., Boston). *N. Engl. J. Med.* 287(2):72-75, 1972.

Pancreatic pseudocysts extending into the spleen were diagnosed and totally excised by distal pancreatectomy and splenectomy in 4 patients (2 men and 2 women, aged 33-60 yr). Three of the patients were alcoholics, and 3 had histories consistent with chronic (2) or acute (1) pancreatitis. These intrasplenic pseudocysts were associated with dissection of the capsule of the spleen from the pulp by a subcapsular hematoma that had ruptured into the peritoneal space (1); gastritis in the area of the stomach adherent to the splenopancreatic mass (1); hemorrhage from the splenic artery (1); and thrombosis of the splenic vein with multiple splenic infarcts. Use of total pseudocyst excision obviates the need for internal or external drainage of the pseudocyst and eliminates the danger of hemorrhage after decompression of the pseudocyst.

2709 WATER, ELECTROLYTE, AND PROTEIN SECRETIONS OF THE HUMAN EXOCRINE PANCREAS IN THE EARLY POSTOPERATIVE PERIOD. *(E.)* Tournut, R.; White, T. T. (Univ. Washington Sch. Med., Seattle). *Surg. Gynecol. Obstet.* 135(1):17-21, 1972.

The exocrine pancreatic secretion of 19 patients was studied during the first postoperative week after drainage of the pancreatic duct following sphincteroplasty or resection of the head of the pancreas. Of these patients, 10 had a normal pancreas and 9 had pancreatitis. The juice was collected by transduodenal drainage of the main pancreatic duct. The average volume secreted during the first two postoperative days was about 200 ml/day during 3rd-5th days, 550 ml/day; and later, about 900 ml/day. The patients with pancreatitis had a lower rate of secretion than the patients with a normal pancreas. The average daily protein output was the same in normal and pancreatitis patients, about 1.5 g/day until the patient ate at which time there was a sharp rise to about 4 g/day. Since collections were incomplete, actual daily secretion rates are thought to be somewhat higher than these figures. The higher protein concentrations in the patients with pancreatitis suggests that protein plugs might form in the small ducts of patients with pancreatitis, leading possibly to chronic pancreatitis. Comparison between the effects of secretins produced by Boots and Jorpes showed that the latter is 10 times more active in producing water and electrolyte secretions than the former on a unit basis. Patients should be given low dosages of secretin in the immediate postoperative period while they are undergoing gastric suction to obtain a good flush-out of the pancreatic ducts and prevent the formation of protein plugs.

710 ORAL MANIFESTATIONS OF PORPHYRIA. *(E.)* Gilhuus-Moe, O.; Koppang, H. S. (Dental Sch., Univ. Oslo, Norway). *Oral Surg.* 33(6):926-933, 1972.

The etiology, classification, symptomatology, and clinical patterns of the various types of porphyria and a case of hepatic porphyria (with acute abdominal, neurologic, and cutaneous symptoms) are presented. The patient, a 29 yr old female, developed bullous lesions of the oral mucosa subsequent to mild traumas occurring during routine dental examination and treatment. The clinical pattern and the localization of these lesions indicate a relation between the basal metabolic disease and the oral symptoms. The patient's history included a diagnosis of acute pancreatitis at 23 yr of age, heavy pigmentation caused by sun exposure at 20, and hepatic porphyria at 26. The oral erosions healed uneventfully a few days after withdrawal of dental treatment. The histopathologic findings of the oral lesions are similar to those observed in porphyric skin lesions. There is close clinical and histopathological resemblance between the cutaneous and mucous lesions of porphyria. Because of lesions described above, porphyria should be considered in differential diagnosis in patients with oral bullous lesions of unknown etiology.

2711 MANAGEMENT OF PANCREATIC PSEUDOCYSTS. *(E.)* Anderson, M. C. (Med. Coll. Ohio, Toledo). *Am. J. Surg.* 123(2):209-221, 1972.

2712 A CASE OF ATYPICAL ACUTE HEMORRHAGIC PANCREATITIS. *(Gr.)* Cholevas, M.; Imprialos, P.; Panayotopoulos, E.; Galanis, N.; Makris, G. (Pediatr. Clin., Aristotelian Univ., Thessalonika, Greece). *Galenus* 12(3):258-269, 1972.

2713 SUBACUTE RELAPSING PANCREATITIS: RARE COMPLICATION OF END-TO-SIDE BILIODIGESTIVE ANASTOMOSES. *(Fr.)* Lataste, J.; Melet, J.; Calmat, A. (Intercommunal Hosp., Creteil, France). *Nouv. Presse Med.* 1(24):1623-1626, 1972.

2714 THE PRACTICING PHYSICIAN AND CHRONIC PANCREATITIS. *(Ger.)* Roge, J.; Gosset, F.; James, J. M. (Broussais Hosp., Paris, France). *Munchen. Med. Wochenschr.* 113(52/53):1725-1730, 1971.

2715 PANCREATIC DISEASE: ACUTE PANCREATITIS. *(Sp.)* Velasquez, O.; Ramirez, H. (Fac. Med., Univ. Antioquia, Medellin, Colombia). *Antioquia Med.* 22(2):195-230, 1972.

2716 PANCREATITIS DURING PREGNANCY. *(Ger.)* Voita, K. M.; Giese, J. (Meiningen Regional Hosp., Germany). *Zentralbl. Gynaekol.* 94(32):1023-1027, 1972.

2717 A REVIEW OF 64 PATIENTS WITH PANCREATIC CYSTS. *(E.)* Scharplatz, D.; White, T. T. (Univ. Washington, Sch. Med., Seattle). *Ann. Surg.* 176(5):638-640, 1972.

2718 DEVELOPMENT OF ACUTE PANCREATITIS AFTER INTRASYNOVIAL ADMINISTRATION OF HYDROCORTISONE. *(Rus.)* Lukash, N. V. (Crimean Med. Inst., Simferopol, USSR). *Klin. Med. (Mosk.)* 50(8):131-133, 1972.

2719 PERITONEAL IRRIGATION WITH DIALYSIS FLUIDS IN SEVERE FORMS OF ACUTE PANCREATITIS. *(Pol.)* Jackiewicz, Z.; Jankau, O.; Tomaszewski, P. (Acad. Med., Gdansk, Poland). *Pol. Przegl. Chir.* 44(6):1019-1021, 1972.

2720 ACUTE PANCREATITIS: MEDICAL OR SURGICAL EMERGENCY? *(Fr.)* Vankemmel, M.; Lagache, G. (Munic. Hosp., Lille, France). *Lille Med.* 17(4):622-630, 1972.

2721 PANCREATIC DISEASE AS THE CAUSE OF ABDOMINAL PAIN IN A FIVE-YEAR-OLD BOY. *(Pol.)* Goscinska, Z.; Legutko, L.; Lowenhoff, I. (Acad. Med., Krakow, Poland). *Pediatr. Pol.* 47(8):1033-1036, 1972.

2722 THE USE OF DUODENOSCOPY IN THE DIAGNOSIS OF PANCREATIC DISEASE: TWO CASE REPORTS. *(Fr.)* Lagadec, B.; Gateau, P.; Chavy, A.; Liguory, C. (St. Antoine Hosp., Paris, France). *Chirurgie* 98(9):549-552, 1972.

2723 SOME FEATURES OF LIPID METABOLISM IN EXPERIMENTAL PANCREATITIS. *(Rus.)* Simavorian, P. S. (Erevan Inst. Postgrad. Med., USSR). *Patol. Fiziol. Eksp. Ter.* 16(4):69-72, 1972.

2724 PANCREATIC ASCITES IN THE ADOLESCENT. *(Por.)* Marchese, L. T.; Costa, F.; Pareja, J. C.; Soares, E. C. (Health Sci. Ctr., State Univ., Londrina, Brazil). *Arq. Gastroenterol.* 9(4):215-217, 1972.

2725 OUR EXPERIENCE WITH ACUTE PANCREATITIS. *(Ser.)* Granic, M.; Granic, K.; Hripach, L. (Gen. Hosp., Pancheva, Yugoslavia). *Srp. Arh. Celokup. Lek.* 99(10/11):719-724, 1971.

2726 INTERSTITIAL PANCREATITIS IN THE CONGENITAL RUBELLA SYNDROME. *(Ger.)* Bunnell, C. E. (Dept. Path., U. Florida Coll. Med., Gainesville). *J. Pediat.* 80(3):465-466, 1972.

2727 PANCREATITIS PRESENTING AS A COLONIC FISTULA. *(E.)* Corlette, Jr., M. B.; Lynch, J. A. (Boston City Hosp., Mass.). *Arch. Surg.* 104(5):708-709, 1972.

2728 HYPERGLYCEMIC HYPEROSMOLAR COMA ASSOCIATED WITH HYDROCHLOROTHIAZIDE AND PANCREATITIS. *(E.)* Diamond, M. T. (Northern Westchester Hosp., Mt. Kisco, N.Y.). *N.Y. State J. Med.* 72(13):1741-1742, 1972.

See also 2092, 2243, 2245, 2698.

LIVER AND BILIARY TRACT

2729 COMBINED PERITONEOSCOPY AND LIVER BIOPSY IN THE DIAGNOSIS OF HEPATIC NEOPLASM. *(E.)* Jori, G. P.; Peschle, C. (Inst. Med. Pathol., Univ. Naples, Italy). *Gastroenterology* 63(6):1016-1019, 1972.

In 48 cases of suspected hepatic neoplasm, a combined procedure was carried out, including a blind transthoracic biopsy of the liver, peritoneoscopy, and a second biopsy done under peritoneoscopic guidance. Blind and controlled biopsies afforded positive results, respectively, in 39.5% and 69% of cases. Examination of both bioptic specimens improved diagnostic accuracy to 75% of cases. These figures compare favorably with those obtained in postmortem investigations. Cancer diagnosis suspected in 2 patients at peritoneoscopy were in actuality 2 cases of advanced cirrhosis in which the coexistence of malignancy was strongly suggested by the extreme irregularities of the liver surface. Both biopsy procedures yielded better results for hepatocarcinoma and/or cholangiocarcinoma than for metastatic cancer.

2730 FATTY LIVER IN DIABETES: A CYTOLOGICAL STUDY. *(E.)* Wasastjerna, C.; Reissell, P.; Karjalainen, J.; Ekelund, P. (Kivela Hosp., Helsinki, Finland). *Acta Med. Scand.* 191:225-228, 1972.

Cytological liver specimens from 100 diabetics have been stained by the May-Grunwald-Giemsa method with oil red O. Satisfactory smears were obtained in 91 cases (57 female, 34 male; aged 20-83 yr, mean 60 yr). Fatty liver was found in 48%, and vacuolated nuclei in 57%. No steatosis was apparent in liver specimens from 47 of the 91 cases studied. The degree of steatosis increased with age, but had no correlation with the duration of diabetes. A close correlation was found between obesity and fatty liver, and some correlation was found between the serum triglyceride level and fatty liver. Fatty liver occurred less frequently in insulin-treated patients than those treated with oral medication and/or diet. The serum cholesterol level did not correlate with the incidence of fatty liver.

This was commoner in maturity-onset diabetes than in young insulin-treated diabetics. Nuclear vacuolation was commoner in fatty-liver than in normal liver cells. Application of the fine-needle aspiration biopsy technique, together with staining of the smears with oil red O, is useful method for study of the incidence of fatty liver.

2731 INTERMITTENT ACUTE PORPHYRIA: DEMONSTRATION OF A GENETIC DEFECT IN PORPHOBILINOGEN METABOLISM. *(E.)* Meyer, U. A.; Strand, J.; Doss, M.; Rees, A. C.; Marver, H. S. (Dept. Med., Univ. California, San Francisco). *N. Engl. J. Med.* 286(24):1277-1282, 1972.

In a family with intermittent acute porphyria 5 affected members had lower erythrocyte uroporphyrinogen 1 (URO)-synthetase activity than unaffected relatives or normal controls. However, 2 seemingly unaffected siblings with normal urinary excretion of porphyrin precursors had low erythrocyte URO-synthetase activity. These siblings were given a single dose of δ-aminolevulinic acid (ALA) to mimic the endogenous overproduction of ALA that occurs in affected family members. The conversion of exogenous ALA to porphyrins excreted in urine and stool was decreased in these 2 siblings in a manner similar to the excretion pattern in patients with intermittent acute porphyria. In one of these 2 siblings an acute attack of intermittent acute porphyria developed spontaneously 6 months after completion of this study. In contrast, 2 siblings with normal erythrocyte URO-synthetase activity had normal conversion of ALA to porphyrins. These findings suggest that decreased erythrocyte URO-synthetase activity is a manifestation of the primary genetic lesion in intermittent acute porphyria. Measurement of erythrocyte URO-synthetase activity may allow identification of carriers of intermittent acute porphyria in the absence of clinical or chemical manifestations of the disease and may serve as an aid in the management and genetic counseling of families with this disorder.

2732 IMMUNOLOGICAL STUDIES IN UGANDAN PATIENTS WITH HEPATOCELLULAR CARCINOMA. *(E.)* Primack, A.; Vogel, C. L.; Barker, L. F. (Uganda Cancer Inst., Kampala). *Br. Med. J.* 1(5844):16-19, 1973.

Immunological studies were performed on 49 consecutive patients with hepatocellular carcinoma to test the hypothesis that the high rate of persistence of hepatitis-associated antigen in these patients is the result of defects in host immune response. Of the 49 patients, 35 were men, 14 women; mean age was 39 yr; 26 had concomitant cirrhosis, 23 did not; 6 had metastatic disease. Additional immunoglobulin determinations were made from 8 healthy Kampala residents, 9 patients with malignant conditions without cirrhosis, 10 patients with cirrhosis without cancer, 18 patients with cancer of non-hepatic origin, and 10 patients with acute viral hepatitis. The responses to 1-chloro-2,4-dinitrobenzene sensitization and to a battery of recall skin test antigens were normal, as was the humoral antibody response to tularemia antigen. Neither hypogammaglobulinemia nor specific immunoglobulin deficiencies were found. Thus it appears unlikely that generalized defects in host immune responses can account for the high incidence of persistent hepatitis B virus infection found in Ugandan patients with hepatocellular carcinoma.

2733 SPONTANEOUS RUPTURE OF HEPATOCELLULAR CARCINOMA. *(E.)* Ong, G. B.; Taw, J. L. (Queen Mary Hosp., Univ. of Hong Kong). *Br. Med. J.* 4(5833):146-149, 1972.

Ruptured hepatoma with intraabdominal hemorrhage (42 cases; 37 male, 5 female; aged 12-72 yr, most in their 3rd or 4th decade) were seen over a period of 8 yr in the professorial surgical unit at the Queen Mary Hospital, Hong Kong. In all, 207 cases of liver cancer were seen during this period, giving an incidence of rupture of 14.5%. The clinical features were the sudden onset of pain with shock and the presence of blood in the peritoneal cavity. The diagnosis was made before operation on suspicion and by a process of elimination. In cases of doubt, abdominal paracentesis was performed to determine whether there was blood in the peritoneal cavity. Treatment was directed to control of hemorrhage and resection. In 13 of the 42 cases resection was possible. In those cases where no curative treatment was possible, hemorrhage control was achieved in 8 patients by packing the tumor, in 1 patient by the evacuation of the tumor, in 1 patient by the evacuation of the necrotic tumor and suturing of the liver capsule, in 12 patients by ligation of the hepatic artery in 1 patient by enucleation and suture. The prognosis, although extremely poor, is no worse than the hepatocellular carcinoma that has not ruptured. There was one long-term survivor: a patient who had undergone an extensive resection. The man was alive and well after more than 5 yr.

2734 THE BLOOD SUPPLY OF EXPERIMENTAL LIVER METASTASES. III. THE EFFECTS OF ACUTE LIGATION OF THE HEPATIC ARTERY OR PORTAL VEIN. *(E.)* Ackerman, N. B.; Lien, W. M.; Silverman, N. A. (Menorah Med Ctr., Kansas City, Mo.). *Surgery* 71(4):636-641, 1972.

2735 THE SURGICAL MANAGEMENT OF LIVER TRAUMA. *(E.)* White, P.; Cleveland, R. J. (Harbor Gen. Hosp., Los Angeles, Calif.). *Arch. Surg.* 104(6):785-786, 1972.

2736 SUBCAPSULAR HEMATOMA OF THE LIVER. NONOPERATIVE MANAGEMENT. *(E.)* Richie, J. P.; Ronkalsrud, E. W. (Dept. Surg. UCLA Sch. Med., Los Angeles). *Arch. Surg.* 104(6):781-784, 1972.

2737 BIOCHEMICAL ANALYSIS OF LIVER BIOPSY SPECIMENS, BONE MARROW, PERIPHERAL WHITE AND RED CELLS, AND SERUM FOR THE DIAGNOSIS IN VIVO OF NIEMANN-PICK DISEASE. *(E.)* Giardini, O.; Cardi, E.; Castro, M.; Donfrancesco, A. (Dept. Pediatr., Univ. Rome, Italy). *Clin. Chim. Acta* 42(1):15-20, 1972.

2738 HEPATIC ADENOMA WITH MALIGNANT CHANGE: A CASE REPORT. *(E.)* Pimparkar, B. D.; Bhalerao, R. A.; Deodhar, K. P.; Nerurkar, M. G.; Mehta, J. M. (K.E.M. Hosp., Bombay, India). *J. Assoc. Phys. India* 29(5):391-396, 1972.

2739 MICELLE FORMATION BY BILE SALTS. *(E.)* Carey, M. C.; Small, D. M.; (Boston Univ. Med. Ctr.). *Arch. Intern. Med.* 130(4):506-527, 1972.

2740 THE ROLE OF BILE ACIDS IN THE OVERALL REGULATION OF STEROID METABOLISM. *(E.)* Wilson, J. D. (Univ. Texas Southwestern Med. Sch., Dallas). *Arch. Intern. Med.* 130(4):493-505, 1972.

2741 TREATMENT OF HYPERCHOLESTEROLEMIA BY INTERFERENCE WITH BILE ACID METABOLISM. *(E.)* Grundy, S. M. (Phoenix Indian Med. Ctr., Ariz.) *Arch. Intern. Med.* 130(4):638-648, 1972.

2742 HISTOLOGICAL ENZYME STUDY OF HUMAN EXTRA- AND INTRAHEPATIC CHOLESTASIS. *(Fr.)* Lageron, A.; Theodoropoulos, G.; Caroli, J. (St. Antoine Hosp., Paris, France). *Presse Med.* 79(47): 2099-2103, 1971.

2743 SERUM ALPHA-FETOGLOBULIN AND PRIMARY CANCER OF THE LIVER IN TAIWAN. *(E.)* Lin, T. Y.; Chu, S. H.; Chen, M. F.; Chen, C. H. (Natl. Taiwan Univ. Hosp., Taipei). *Cancer* 30(2):435-443, 1972.

2744 PRIMARY HEPATOMA AND HEPATITIS-ASSOCIATED ANTIGEN IN A YOUNG WHITE WOMAN. *(E.)* Campion, E. C.; Ludbrook, J.; McLeod, G. M.; Marshall, V. R.; Mukherjee, T.; Wangel, A. G. (Queen Elizabeth Hosp., Woodville, Australia). *Br. Med. J.* 4(5833):149-152, 1972.

2745 PARENCHYMAL HAMARTOMA OF THE LIVER IN INFANTS AND CHILDREN. *(E.)* Tate, R. C.; Chacko, M. V.; Singh, S.; Ogden, L. (St. Joseph Infirm., Louisville, Ky.). *Am. J. Surg.* 123(3):346-350, 1972.

2746 CONGENITAL HEPATIC FIBROSIS: REPORT OF TWO NEW CASES AND REVIEW OF THE LITERATURE. *(E.)* Sommerschild, H. C.; Langmark, F.; Maurseth, K. (Rikshospital, Oslo, Norway). *Surgery* 73(1): 53-58, 1973.

2747 MODERN CONCEPTS OF SURGERY IN LIVER TRAUMA. *(E.)* Balasegaram, M. (Gen. Hosp., Kuala Lumpar, Malasia). *J. R. Coll. Surg. Edinb.* 16(6):313-328, 1971.

2748 TWO CLAVICULAR METASTASES AS MANIFESTATIONS OF PRIMARY LIVER CANCER. *(Fr.)* Vovor, V. M.; Odoulami, H.; Diop, A.; Balde, I.; Wade, A. (no affil.). *Bull. Soc. Med. Afr. Noire Lang. Franc.* 17(1):71-81, 1972.

2749 HUMAN LIVER REPLACEMENT: AN INTERIM EVALUATION. *(E.)* Dent, D. M.; Terblanche, J. (Univ. Bristol, England). *S. Afr. Med. J.* 46(19): 577-579, 1972.

2750 PERITONITIS FROM AMOEBIC LIVER ABSCESS. *(E.)* Archampong, E. Q. (Ghana Med. Sch., Accra). *Br. J. Surg.* 59(3):179-181, 1972.

2751 HEPATIC FRUCTOSE-1,6-DIPHOSPHATASE DEFICIENCY: A CAUSE OF LACTIC ACIDOSIS AND HYPOGLYCEMIA IN INFANCY. *(E.)* Pagliara, A. S.; Karl, I. E.; Keating, J. P.; Brown, B. L.; Kipnis, D. M. (Washington Univ. Sch. Med., St. Louis, Mo.). *J. Clin. Invest.* 51(8):2115-2123, 1972.

2752 REGIONAL HEPATIC BLOOD FLOW STUDIED BY INTRAHEPATIC INJECTION OF ^{133}XENON IN NORMALS AND IN PATIENTS WITH PRIMARY CARCINOMA OF THE LIVER WITH PARTICULAR REFERENCE TO THE EFFECT OF HEPATIC ARTERY LIGATION. *(E.)* Plengvanit, U.; Suwanik, R.; Chearanai, O.; Intrasupt, S.; Sutayavanich, S.; Kalayasiri, C.; Viranuvatti, V. (Siriraj Hosp., Mahidol Univ. Thailand). *Aust. N. Z. J. Med.* 2(1):44-48, 1972.

2753 METABOLISM OF AMYLOBARBITONE IN PATIENTS WITH CHRONIC LIVER DISEASE. *(E.)* Mawer, G. E.; Miller, N. E.; Turnberg, L. A. (Roy. Infirm., Manchester, England). *Br. J. Pharmacol.* 44(3): 549-560, 1972.

2754 PROLONGED INTERMITTENT ARTERIAL INFUSION FOR METASTATIC CARCINOMA OF THE LIVER. *(E.)* Humphrey, L. J. (Emory Univ. Coll. Med., Atlanta, Ga.). *Am. Surg.* 38(8):425-427, 1972.

2755 SERUM ALPHA-FETOPROTEIN AND RESECTION OF PRIMARY HEPATIC CANCER. *(E.)* Sugahara, K.; Kashii, A.; Kogure, H.; Manaka, J.; Shirakura, T.; Mitani, S. (Fac. Med., Univ. Tokyo, Japan). *Arch. Surg.* 106(1):63-65, 1973.

2756 LIVER TRAUMA: CURRENT METHOD OF MANAGEMENT. *(E.)* Lim, Jr., R. C.; Knudson, J.;

Steele, M. (San Francisco Gen. Hosp., Calif.). *Arch. Surg.* 104(4):544-549, 1972.

2757 THE MANAGEMENT OF CLOSED LIVER TRAUMA TREATED BY HEMIHEPATECTOMY. *(E.)* Gillett, D. J. (Austin Hosp., Heidelberg, Australia). *Aust. N.Z. J. Surg.* 41(4):330-334, 1972.

2758 HEPATOCELLULAR CARCINOMA, DIAGNOSED FOLLOWING METASTASIS TO THE MANDIBLE: REPORT OF A CASE. *(E.)* Yacabucci, J. E.; Mainous, E. G.; Kramer, H. S. (U.S. Naval Hosp., San Diego, Calif.). *Oral Surg.* 33(6):889-893, 1972. 889-893, 1972.

2759 HEPATIC ARTERY LIGATION IN PRIMARY AND SECONDARY HEPATIC CANCER. *(E.)* Koudahl, G.; Funding, J. (Rigshospital, Copenhagen, Denmark). *Acta Chir. Scand.* 138:289-292, 1972.

2760 LIVER DISEASE AND PREGNANCY. *(E.)* Taylor, J. D. (Roy. Women's Hosp., Melbourne, Australia). *Med. J. Aust.* 1(1):15-17, 1972.

2761 HEPATOCELLULAR CARCINOMA IN NIGERIANS: A STUDY OF 144 AUTOPSY PROVEN CASES (1958-1968). *(E.)* Francis, T. I.; Smith, J. A. (Univ. Coll. Hosp., Ibadan, Nigeria). *W. Afr. Med. J.* 21(2):37-42, 1972.

2762 PRIMARY HEPATIC CARCINOMA: A REVIEW OF THIRTY-SEVEN PATIENTS. *(E.)* Kappel, D. A.; Miller, D. R. (Univ. Kansas Med. Ctr., Kansas City). *Am. J. Surg.* 124(6):798-802, 1972.

2763 DIAGNOSIS OF HEPATOMA: PRELIMINARY NOTE. *(E.)* Franco, J.; Coppler, M.; Kovaleski, B.; Nelson, V.; Collins, K.; Vanags, K. (O'Connor Hosp. Med. Ctr., San Jose, Calif.). *J. Nucl. Med.* 13(8):644-645, 1972.

2764 HEPATIC SURGERY. *(E.)* Balasegaram, M. (no affil.). *J. R. Coll. Surg. Edinb.* 17(2):85-89, 1972.

2765 α-FETOPROTEIN AND HEPATOCARCINOGENESIS IN RATS FED 3'-METHYL-4-(DIMETHYLAMINO)AZOBENZENE OR N-2-FLUORENYLACETAMIDE. *(E.)* Kitagawa, T.; Yokochi, T.; Sugano, H. (Cancer Inst., Tokyo, Japan). *Int. J. Cancer* 10(2):368-381, 1972.

See also 2191, 2193, 2234, 2236, 2240, 2243, 2244, 2246, 2247, 2248, 2251, 2257, 2259, 2261, 2263, 2265, 2270, 2277, 2282, 2292, 2294, 2296, 2302, 2303, 2306, 2307, 2310, 2397, 2512, 2526, 2593, 2606, 2686, 2824, 2852, 2944, 2949, 2950, 2951.

LIVER AND BILIARY TRACT

Hyperbilirubinemic States

2766 STUDIES ON PERSISTENT CONJUGATED HYPERBILIRUBINEMIA IN THE NEWBORN: THE DIAGNOSIS OF PREVALENT TYPES. *(E.)* Wishahi, A. G.; Aboul-Dahab, Y. K. W.; Soliman, L. A. M.; Daraz, S. (Ain Shams Fac. Med., Cairo, Egypt). *J. Egypt. Med. Assoc.* 54(10):671-699, 1971.

2767 POSTOPERATIVE JAUNDICE. *(E.)* LaMont, J. T.; Isselbacher, K. J. (Massachussets Gen. Hosp., Boston). *N. Engl. J. Med.* 288(6):305-307, 1973.

See also 2124, 2129, 2155.

LIVER AND BILIARY TRACT

Acute Nonviral Hepatitis and Hepatic Injury

2768 HEPATIC DAMAGE AND DEATH FROM OVERDOSE OF PARACETAMOL. *(E.)* Clark, R.; Thompson, R. P. H.; Borirakchanyavat, V.; Widdop, B.; Davidson, A. R.; Goulding, R.; Williams, R. (King's Coll. Hosp. Med. Sch., London, England). *Lancet* 1(7794):1966-1970, 1973.

f a series of 60 patients (45 female, 15 male; aged 5-58 yr with 39 less than 30 yr old and 11 teenagers) admitted after acetaminophen overdose, 49 developed liver damage. Of these 60, 19 had allegedly taken alcohol, barbiturate, nitrazepam, diazepam, or chlordiazepoxide at the same time. Doses of acetaminophen ranged from 25-75 g. Hepatic encephalopathy developed in 17, and 12 of these died from fulminant hepatic failure. All but 2 patients with bilirubin levels above 4 mg/100 ml by the 3rd-5th day developed encephalopathy. It is suggested that the degree and prognosis of the liver damage in the first few days can be assessed from the serum bilirubin and prothrombin time. Histology of liver biopsy specimens of those who recovered showed severe centrilobular necrosis and collapse, but no patient has progressed to cirrhosis. Although patients may appear well in the first 3 days after ingestion except for anorexia, nausea, and vomiting which may or may not be severe, it is likely that the liver damage can be prevented only in the first 24 hr.

2769 HEPATOSPLENIC ABSCESSES DUE TO YERSINIA ENTEROCOLITICA. *(E.)* Rabson, A. R.; Koornhof, H. J.; Notman, J.; Maxwell, W. G. (Sch. Pathol., Univ. Witwatersrand, Johannesburg, South Africa). *Br. Med. J.* 4(5836):341, 1972.

2770 HEPATIC FAILURE IN A CASE OF MYCOSIS FUNGOIDES: A CASE REPORT AND REVIEW OF THE LITERATURE. *(E.)* Albukerk, J.; Duffy, J. L. (Nassau County Med. Ctr., East Meadow, N.Y.). *Am. J. Dig. Dis.* 18(1):59-64, 1973.

2771 METABOLIC STUDIES IN EXPERIMENTAL LIVER DISEASE RESULTING FROM D(+)-GALACTOSAMINE ADMINISTRATION. *(E.)* Record, C. O.; Alberti, K. G. M. M. (Radcliffe, Infirm., Oxford, England). *Biochem. J.* 130(1):37-44, 1972.

2772 TOXOPLASMA SEROLOGIC SURVEY ON HEPATITIS PATIENTS. *(E.)* Botros, B. A. M.; Fair-Child, D. G. (Navy Med. Res. Unit-3, c/o Spanish Embassy, Cairo, Egypt). *J. Egypt. Public Health Assoc.* 47(2):69-73, 1972.

2773 EFFECTS OF MICROSOMAL ENZYME INDUCERS ON ANIMALS POISONED WITH HEPATOTOXINS. *(E.)* Hurwitz, A. (Univ. Kansas Med. Ctr., Kansas City). *Toxicol. Appl. Pharmacol.* 22(3):339-346, 1972.

2774 HYPERVOLEMIA AND HEMOCONCENTRATION IN "GALACTOSAMINE HEPATITIS" IN THE RAT. *(Ger.)* Liehr, H.; Grun, M.; Richter, E.; Thiel, H.; Krauss, H.; Brachtel, H. (Med. Inst., Univ. Wurzburg, Germany). *Klin. Wochenschr.* 50(10):524-526, 1972.

LIVER AND BILIARY TRACT

Acute Viral Hepatitis

2775 THE PROTECTIVE EFFICACY OF IMMUNE SERUM GLOBULIN IN HEPATITIS A: A STATISTICAL APPROACH. *(E.)* Landrigan, P. J.; Huber, D. H.; Murphy, G. D., III; Creech, W. B.; Bryan, J. A. (Ctr. Disease Control, Atlanta, Ga.). *J.A.M.A.* 223(1):74-75, 1973.

In a county population of 28,677, 118 cases of hepatitis A (person-to-person transmission) were reported; 87 (73.8%) of these cases were in children 5-14 yr old. On interviewing 108 patients, the only common ground that could be established for transmission was personal exposure to a patient. This was positively stated by 50 (46.2%) and strongly presumed in another 44 (40.8%). The efficacy of immune serum globulin prophylaxis among family members of patients was 87%-98%. (Six cases did occur within 7 days of inoculation.). Discounting 5 patients with symptoms manifested within 7 days after inoculation, the efficacy of immune serum globulin in preventing hepatitis symptoms in persons not already infected was 98%. The efficacy of preparations was determined by a formula used previously to measure live-virus vaccine efficacy in epidemics.

2776 FULMINANT HEPATITIS WITH COMA SUCCESSFULLY TREATED BY PLASMAPHERESIS AND HYPERIMMUNE AUSTRALIA-ANTIBODY-RICH PLASMA. *(E.)* Lepore, M. J.; McKenna, P. J.; Martinez, D. R.; Stutman, L. J.; Bonanno, C. A.; Conklin, E. F.; Robilotti, Jr., J. G. (St. Vincent's Med. Ctr. Hosp., New York). *Am. J. Gastroenterol.* 58(4):381-389, 1972.

A 20-yr-old patient with Australia antigen-positive hepatitis, which had occurred in the 6th month of pregnancy, also developed fulminant hepatic failure shortly after her delivery. Within 24 hr of delivery, the mother's SGOT rose to 3,900 U and the prothrombin time to 36.5 sec. Tests revealed the umbilical cord blood, amniotic fluid, and the baby's blood were all negative for Australia antigen. Plasmapheresis with plasma exchange was instituted in the mother. Her blood became negative for Australia antigen, and she emerged from coma on the 5th day of treatment; plasmapheresis was terminated. Within 48 hr, she developed pulmonary infiltrates, leukocytosis, and fever and her blood was again positive for Australia antigen. Resumption of plasmapheresis was contraindicated by thrombocytopenia. Hyperimmune Australia-antibody-rich plasma (220-350 ml/day) was given slowly i.v. for 3 days. A dramatic clinical response ensued, the patient's blood became negative for Australia antigen, and she proceeded to make steady and ultimately complete recovery.

2777 ACQUISITION OF ANTIBODY TO HEPATITIS B ANTIGEN IN THREE SOCIOECONOMICALLY DIFFERENT MEDICAL POPULATIONS. *(E.)*

Cherubin, C. E.; Purcell, R. H.; Lander, J. J.; McGinn, T. G.; Cone, L. A. (New York Med. Coll., N.Y.). *Lancet* (7769):149-151, 1972.

Sera from 3 socioeconomically distinct, age-stratified, patient populations were tested for antibody to hepatitis B antigen (anti-HBAg) by a sensitive radioimmunoassay procedure. Patients who were drug users or had overt liver disease were excluded from the sample. The populations studied were: admissions to Harlem Hospital, a municipal hospital serving a low socioeconomic status Black population; admissions to Staten Island Hospital, a voluntary hospital, serving a middle socioeconomic class White population; and consecutive patients of high socioeconomic status seen in a Park Avenue internist's practice. A population of 292 former drug addicts was also studied. Little antibody was acquired before 20 yr of age; between 20 and 50 yr there was a striking rise, with no increase thereafter. By the age of 50, antibody was present in 43% of patients of low socioeconomic status, in 22% of patients of middle socioeconomic status, and in 15% of high socioeconomic status patients. Antibody was found in 52% of former drug addicts. The antibody-acquisition curve differed from that of most fecal/orally transmitted viral diseases. These findings suggest that the virus of hepatitis B is endemic in low socioeconomic populations. The vast majority of the patients studied had not been exposed to recognized modes of parenteral transmission, i.e. blood products or narcotics usage. Therefore, the virus is probably spread, at least in part, by nonparenteral (or inapparent parenteral) means.

2778 NEONATAL ONSET OF THE HEPATITIS-ASSOCIATED-ANTIGEN CARRIER STATE. *(E.)*

Merrill, D. A.; Dubois, R. S.; Kohler, P. F. (Univ. Colorado Med. Ctr., Denver). *N. Engl. J. Med.* 287(25):1280-1282, 1972.

A group of 5 mother-child pairs has been studied to determine whether transmission of hepatitis B antigen (HBAg) from mother to infant might occur at birth, leading to a chronic HBAg carrier state in the infant. Of the 5 infants, 4 became HBAg positive 6-12 weeks after birth and have maintained high serum antigen levels (oldest one is 22 months). All mothers had antigen-positive hepatitis at or soon after delivery. Umbilical cord sera were negative in 3 cases for both antigen and antibody, (ruling out placental transfer of HBAg). None of of the infants has ever had detectable antibody although the fifth had HBAg at birth. The appearance of HBAg in the infants did not arise from prolonged ontact with the mother after birth (one pair was immediately and permanently separated). Neither did it arise from colostrum (not all were breast fed). In these cases, infection of the infant probably occurred with contact of the mother's blood, either shortly before or at the time of birth.

2779 TISSUE LOCALIZATION OF AUSTRALIA ANTIGEN IMMUNE COMPLEXES IN ACUTE AND CHRONIC HEPATITIS AND LIVER CIRRHOSIS. *(E.)*

Nowoslawski, A.; Krawczynski, K.; Brzosko, W. J.; Madalinski, K. (State Inst. Hyg., Warsaw, Poland). *Am. J. Pathol.* 68(1):31-56, 1972.

The following study was undertaken to ascertain whether humoral response to Australia (hepatitis-associated) antigen (Au/HAA) is important in the pathogenesis of liver lesions in acute and chronic hepatitis. Examined cases included fulminant hepatitis (4 cases), subacute hepatitis (5), chronic aggressive hepatitis (7), liver cirrhosis (11), and chronic persistent hepatitis (2).
In a significant percentage of these cases Australia (hepatitis-associated) antigen (Au/HAA) was identified in the liver and in extrahepatic locations. The several immunofluorescent patterns of Au/HAA localization in hepatocytes strongly suggested various stages of Au/HAA accumulation and release. Deposits of a mixture of immunoglobulins (Ig) G and M and occasionally β1C-globulin were found in the cytoplasm of Au/HAA containing hepatocytes, on their plasma membranes, on or in the nuclei, in the cytoplasm of Kupffer cells and, rarely, in the sinusoids. The accompanying tissue changes were hepatocellular degeneration and necrosis. These intra- and extracellular complexes of Au/HAA and immunoglobulins displayed strong affinity for guinea pig complement in the immunohistochemical complement fixation reaction. When tested by immunodiffusion in agar, IgG dissociated from these complexes by potassium thiocyanate treatment showed anti-Au/HAA specificity. In fulminant hepatitis neither Au/HAA nor Ig and complement were found in the liver. In chronic aggressive and subacute hepatitis the amount of the Au/HAA immune complexes identified in the liver was approximately inversely proportional to the extent and severity of the parenchymal lesions. In liver cirrhosis and chronic persistent hepatitis there was a positive correlation between the amount of the Au/HAA immune complexes found in the liver and the degree of hepatocellular damage. The deposits of Au/HAA, identified in extrahepatic locations including germinal centers of lymph nodes and spleen, renal glomeruli, and blood vessel walls, were usually accompanied by deposits of IgG, IgM, β1C-globulin and fibrin. All these deposits showed strong affinity for guinea pig complement in the immunohistochemical reaction of complement fixation. Germinal center activation, chronic membraneous glomerulonephritis, panarteritis, and simple arteriolar hyalinosis were found at sites where these deposits were localized.

2780 NATURAL HISTORY OF HEPATITIS-ASSOCIATED ANTIGEN-POSITIVE CHRONIC LIVER DISEASE.

(E.) Dudley, F. J.; Scheuer, P. J.; Sherlock, S. (Roy. Free Hosp., London, England). *Lancet* 2(7792):1388-1393, 1972.

A clinical and pathological study of 59 patients (55 male, aged 4-72 yr at onset of symptoms) with hepatitis-associated antigen (HAA)-positive chronic liver disease is reported. They were predominantly of Mediterranian origin, 25 living in Greece; 12 of the patients were doctors. Liver biopsy demonstrated the changes of chronic persistent (9), lobular (1), or aggressive (24) hepatitis; cirrhosis (19); or primary liver-cell carcinoma (6). In 30 patients chronic disease followed clear evidence of unresolved acute hepatitis. In 29 the condition presented as established chronic liver disease or as primary liver-cell carcinoma. Other diseases included history of tuberculosis (5), renal stones or colic (6), duodenal ulcers (6) and polycystic disease of the kidneys (1). Cholecystectomy for gallstones had been performed in 2. Clinical diabetes existed in 6 before corticosteroid therapy. A colectomy for carcinoma had been performed in 1. Seven patients had diseases suggesting disturbed immunity, including idiopathic thrombocytopenic purpura, rheumatoid arthritis, ulcerative colitis, asthma, past glomerulonephritis, past rheumatic fever, and candidiasis. Clinical evaluation and liver-function tests in the different groups of patients reflected the severity of the underlying hepatic lesion. The serum bilirubin, aspartate transaminase, and γ-globulin levels were rarely very high. Corticosteroids had often been used during the attack of acute hepatitis, and this seemed to predispose to relapses and chronicity. After chronic liver disease was established, corticosteroid therapy produced clinical and biochemical improvement. The progression of HAA-positive liver disease was slow, and, of 33 without primary liver-cell carcinoma who had been followed for an average of 2 yr, only 5, all with established cirrhosis, showed evidence of clinical or biochemical deterioration. Of these, 3 patients died: 2 with primary liver-cell carcinoma and 1 with hepatocellular failure.

2781 SERUM IMMUNOGLOBULIN LEVELS IN AUSTRALIA ANTIGEN POSITIVE AND AUSTRALIA ANTIGEN NEGATIVE HEPATITIS.

(E.) Peters, C. J.; Johnson, K. M. (Natl. Inst. Allergy Infect. Dis., Balboa Heights, Canal Zone, Central America). *Clin. Exp. Immunol.* 11(3):381-391, 1972.

Immunoglobulin (Ig) levels were determined by radial immunodiffusion in uncomplicated cases of acute hepatitis with or without Australia antigenemia. A striking elevation in IgM levels was apparent in initial sera from Australia antigen-negative cases when compared to Australia antigen-positive cases (6.5 versus 1.9 mg/ml). None of 24 Australia antigen-positive cases had sera with more than 3 mg/ml IgM, and only 3 of 58 Australia antigen-negative cases exhibited values below 3 mg/ml. The concentrations of IgG, IgA, or IgD did not differ in initial sera from Australia antigen-positive and Australia antigen-negative subjects. Serial determinations of IgG revealed a transient fall in patients with Australia antigen-positive hepatitis, and a rise in Australia antigen-negative cases. Asymptomatic, Australia antigen-positive Guaymi Indian subjects were compared to group, and no differences in the concentration of IgG, IgM, IgA, or IgD were found, although elevations of IgG and IgM were common in both groups. No evidence of abnormal proteins was found when sera were tested by cellulose acetate electrophoresis or by immunoelectrophoresis against immunoglobulin-specific antisera. Ultracentrifugal analysis failed to detect '7S' IgM.

2782 TREATMENT OF ACUTE HEPATIC COMA BY EX VIVO BABOON AND HUMAN LIVER PERFUSIONS. *(E.)*

Abouna, G. M.; Cook, J. S.; Fisher, L. M.; Still, W. J.; Costa, G.; Hume, D. M. (Depts. Surg. Pathol., and Med., Virginia Commonwealth Univ., Richmond). *Surgery* 71(4):537-546, 1972.

Three female patients (aged 13-24 yr) in deep hepatic coma from fulminant hepatitis were treated by baboon and human liver perfusions after failing to respond to medical treatment and repeated exchange transfusion. Two patients regained normal consciousness after 1 baboon liver perfusion, made complete recovery, and are leading normal lives 11 and 12 months after treatment. The third patient also recovered normal consciousness after each of 2 baboon and 1 human liver perfusion but died 30 days later from bronchopneumonia. Baboon liver perfusions were maintained for 13-21 hr and the human liver perfusion for 52 hr without complications, and neither clinical immunological reaction nor antibaboon serum antibodies developed as a result of treatment. Every perfusion was followed by a significant rise in the level of liver-dependent clotting factors and by marked shortening in the partial thromboplastin time, but all were accompanied by moderate thrombocytopenia. Whereas consciousness could be restored only by liver perfusion, both perfusion and exchange transfusions were effective in clearing bilirubin. Frequent measurements of clotting factors provided a valuable guide in planning supportive therapy, while periodic liver biopsy was helpful in determining prognosis. It is concluded that *ex vivo* baboon or human liver perfusion can provide a safe and effective method for the treatment of acute hepatic coma.

2783 A STUDY OF AUSTRALIA-ANTIGEN-POSITIVE BLOOD DONORS AND THEIR RECIPIENTS WITH SPECIAL REFERENCE TO LIVER HISTOLOGY.

(E.) Reinicke, V.; Dybkjaer, E.; Poulsen, H.; Banke, O.; Lylloff, K.; Nordenfelt, E. (Bispebjerg Hosp., Copenhagen, Denmark). *N. Engl. J. Med.* 286(16): 867-870, 1972.

Systematic screening of 13,300 consecutively registered Danish voluntary blood donors revealed 24 donors (22 males, 17 below 30 yr of age) with Australia-antigenemia which lasted for 13-20 months. None of these had any clinical signs of disease. Liver biopsies were performed on all the Australia-antigenemic donors. In only one of the 24 biopsies was cirrhosis demonstrated. None of the remaining 23 biopsies, including 6 with a completely normal histologic picture, exhibited the change seen in viral hepatitis. A retrospective study was conducted of 22 patients who had received blood from 10 of the 24 donors. The 8 recipients still living had no records of acute hepatitis. Neither Australia-antigen nor Australia-antibody nor elevated transaminase activities could be demonstrated in their blood. None of the 14 who died had a past history of acute hepatitis; autopsies on 10 revealed no evidence of hepatitis.

2784 VIRAL HEPATITIS: AN OCCUPATIONAL HAZARD TO SURGEONS. *(E.)* Rosenberg, J. L.; Jones, D. P.; Lipitz, L. R.; Kirsner, J. B. (Pritzker Sch. Med., Univ. Chicago, Ill.). *J.A.M.A.* 223(4): 395-400, 1973.

2785 AN OUTBREAK OF NONPARENTERALLY TRANSMITTED HEPATITIS B. *(E.)* Bryan, J. A.; Carr, H. E.; Gregg, M. B. (Viral Dis. Br., Ctr. Disease Control., Atlanta, Ga.). *J.A.M.A.* 223(3):279-283, 1973.

2786 POLYKARYOCYTOSIS AND REPLICATION OF MOUSE HEPATITIS VIRUS IN PERITONEAL MACROPHAGES. *(E.)* Lewis, L.; Starr, T. J. (Dept. Biol. Sci., Univ. Illinois, Chicago). *Br. J. Exp. Pathol.* 53(2):202-205, 1972.

2787 EIGHT YEARS OF SURVEILLANCE OF PATIENTS HOSPITALIZED WITH HEPATITIS: INTERPRETATION OF DATA IN LIGHT OF EPIDEMIC PARENTERAL DRUG ABUSE AND AVAILABILITY OF TESTING FOR HEPATITIS-ASSOCIATED ANTIGEN. *(E.)* Grady, G. F.; Bennett, A. J. E.; Culhane, P. O.; Forrest, Jr., J. N.; Iber, F. L. (Lemuel Shattuck Hosp., Boston, Mass.). *J. Infect. Dis.* 126(1):87-91, 1972.

2788 PHENOBARBITAL LIVER MICROSOMAL INDUCTION IN MHV-3 VIRAL HEPATITIS OF THE MOUSE. *(E.)* Budillon, G.; Carrella, M.; Coltorti, M. (Inst. Med. Clin., Univ. Naples, Italy). *Experientia* 28(9):1011-1012, 1972.

2789 FREE AMINO ACID LEVELS IN THE BLOOD OF PREGNANT WOMEN WITH VIRAL HEPATITIS. *(Rus.)* Narzykulova, S. A. (I. P. Pavlov Med. Inst., Samarkand, USSR). *Akush. Ginekol. (Mosk.)* 48(7): 65-67, 1972.

2790 INFECTIOUS HEPATITIS PRESENTING AS JOINT DISEASE. *(E.)* Diserens, R. V. (no affil.). *Ariz. Med.* 29(3):205-207, 1972.

2791 AUSTRALIA ANTIGEN IN SINGAPORE CHINESE PATIENTS WITH HEPATOCELLULAR CARCINOMA AND COMPARISON GROUPS: INFLUENCE OF TECHNIQUE SENSITIVITY ON DIFFERENTIAL FREQUENCIES. *(E.)* Simons, M. J.; Yap, E. H.; Yu, M.; Shanmugaratnam, K. (WHO Immunol. Res. Training Ctr., Singapore). *Int. J. Cancer* 10(2):320-325, 1972.

2792 SOME PHYSICO-CHEMICAL PROPERTIES OF AUSTRALIA ANTIGEN: INVESTIGATIONS BY GEL FILTRATION, POLYACRYLAMIDE AND AGAROSE GEL ELECTROPHORESIS, ABSORPTION AND SPECIFIC PRECIPITATION. *(E.)* Portocala, R.; Popa, L. M.; Repanovici, R. (Stefan S. Nicolau Inst. Virol., Bucharest, Rumania). *Acta Virol. (Praha)* 16(3):191-200, 1972.

2793 MYOCARDIAL INVOLVEMENT IN INFECTIOUS HEPATITIS. *(E.)* Nagaratnam, N.; De Silva, D.P.K.M.; Gunawardene, K.R.W. (Govt. Hosp., Gampaha, Ceylon). *Postgrad. Med. J.* 47(554):785-788, 1971.

2794 IMMUNOGLOBULIN-CONTAINING CELLS IN THE SMALL INTESTINE IN VIRAL HEPATITIS. *(E.)* Soltoft, J.; Soeberg, R. (Gentofte Hosp., Copenhagen, Denmark). *Acta Pathol. Microbiol. Scand.* [*B*] 80(3): 379-387, 1972.

2795 HEPATITIS-ASSOCIATED ANTIGEN IN PREGNANT WOMEN. *(E.)* Skinhoj, P.; Olesen, H.; Cohn, J.; Mikkelsen, M. (Bispebjerg Hosp., Copenhagen, Denmark). *Acta Pathol. Microbiol. Scand.* [*B*] 80(3):362-366, 1972.

2796 OCCURRENCE AND PERSISTENCE OF "AUSTRALIA" ANTIGEN DETERMINANTS. *(E.)* Schmidt, N. J.; Roberto, R. R.; Lennette, E. H. (California State Dept. Public Health, Berkeley). *Infect. Immunity* 6(1):1-4, 1972.

2797 RENAL FUNCTION IN PATIENTS WITH VIRAL HEPATITIS AND OBSTRUCTIVE JAUNDICE. *(E.)* Powierza-Kaczynska, C. (Silesian Med. Acad., Katowice, Poland). *Pol. Med. J.* 11(1):83-90, 1972.

2798 SECRETORY CAPACITY AND TRANSPORT MAXIMUM OF THE LIVER FOR SULFOBROMOPHTHALEIN (BSP) IN INFECTIOUS HEPATITIS IN CHILDREN. *(Ger.)* Gudowski, G.; Wiegand, U.; Heidecke, V.; Jahn, L.; Leucht, B. (Pediatr. Clin., Humboldt Univ., Berlin, Germany). *Dtsch. Gesundheitsw.* 27(27):1267-1269, 1972.

2799 DIFFERENCES IN THE INCIDENCE OF AUSTRALIA ANTIGEN AND SERUM HEPATITIS INFECTIVITY IN TROPICAL AND NONTROPICAL COUNTRIES. *(Ger.)* Rollinghoff, M.; Schafer, E.; Rollinghoff, W. (Ernst Rodenwaldt Inst., Koblenz, Germany). *Med. Klin.* 67(15):535-539, 1972.

2800 PERTURBATION OF VENTRICULAR DYNAMICS IN ACUTE VIRAL HEPATITIS. *(E.)* Dimitriu, S.; Marcu, C.; Georgescu, G.; Iordacheanu, C. (Inst. Med. Pharm., Iasi, Rumania). *Rev. Med. Chir. Soc. Med. Nat. Iasi* 75(4):871-881, 1971.

2801 ACUTE VIRAL HEPATITIS ASSOCIATED WITH ACUTE ACQUIRED HEMOLYTIC ANEMIA. *(E.)* Oesman, I. N.; Tagor, A. H.; Matondang-Siahaan, C.; Markum, A. H.; Darmawan, S. (Med. Sch., Univ. Indonesia, Jakarta). *Paediatr. Indones.* 12(2):92-96, 1972.

2802 PANMYELOPATHY AFTER ACUTE HEPATITIS. *(Ger.)* Schroter, J. (Herford Regional Hosp., Germany). *Munch. Med. Wochenschr.* 114(24): 1138-1142, 1972.

2803 HIGH-VOLTAGE IMMUNOELECTROOSMORPHORESIS IN AUSTRALIA ANTIGEN SCREENING OF BLOOD DONORS. *(E.)* Mason, E. C.; Shaw, A. E.; Harding, M. J.; Witney, K. J. (Red Cross Blood Transfusion Service, Brisbane, Australia). *Med. J. Aust.* 1(20):1020-1023, 1972.

See also 2249, 2270, 2289, 2291, 2296, 2297, 2744.

LIVER AND BILIARY TRACT

Chronic Hepatitis

2804 POSITIVE TISSUE ANTIBODY TEST IN PATIENTS WITH PROLONGED EXTRAHEPATIC BILIARY OBSTRUCTION. *(E.)* Lam, K. C.; Mistilis, S. P.; Perrott, N. (Roy. Prince Alfred Hosp., Camperdown, Sydney, Australia). *N. Engl. J. Med.* 286(26):1400-1401, 1972.

Tissue antibody reactions (antimitochondrial antibody and smooth muscle antibody) were studied in various stages of extrahepatic biliary obstruction. All tests were made on serum specimens stored less than 4 weeks. Primary biliary cirrhosis patients had positive tissue-antibody reactions; other intrahepatic cholestasis patients had negative reactions. Parenchymal liver disease cases reacted as expected. Antibodies were not detected in acute cases of extrahepatic biliary obstruction; they were detected in chronic cases. These findings rule out the use of antimitochondrial antibodies to distinguish between chronic extrahepatic biliary obstruction and primary biliary cirrhosis. The negative reactions following surgical relief of the obstruction in 4 patients suggest these antibodies are secondary to the disease.

2805 IMMUNOFLUORESCENT AND ENZYMATIC STAINING OF BILE CANALICULI IN THE SAME SECTIONS OF THE LIVER. *(E.)* Nielsen, P. M.; Diederichsen, H.; Linde, N. C. (Univ. Hosp., Odense, Denmark). *Am. J. Clin. Pathol.* 58(2):123-126, 1972.

2806 ARTHRITIS AND LIVER DISEASE. *(Ger.)* Brackertz, D.; Muller, W. (Rheumatol. Clin., Univ. Basel, Switzerland). *Schweiz. Med. Wochenschr.* 102(21):730-732, 1972.

2807 UNUSUALLY HIGH TITRES OF ANTIBODIES TO RUBELLA VIRUS IN A PATIENT WITH CHRONIC HEPATITIS. *(E.)* Closs, O.; Haukenes, G.; Bjark, P.; Pande, H. (Gade Inst., Bergen, Norway). *Scand. J. Infect. Dis.* 4:17-22, 1972.

2808 ABSENCE OF NON-ACUTE RUBELLA IgM ANTIBODIES IN CHRONIC HEPATITIS AND RHEUMATOID ARTHRITIS. *(E.)* Desmyter, J. (Rega Inst. Med. Res., Louvain, Belgium). *Lancet* 2(7787):1141-1142, 1972.

2809 ORAL MANIFESTATIONS OF LUPOID HEPATITIS: REPORT OF A CASE. *(E.)* Berdon, J. K.; Girasole, R. V. (Sch. Dent., West Virginia Univ., Morgantown). *Oral Surg.* 33(6):900-904, 1972.

2810 EXPERIMENTAL CHRONIC ACTIVE HEPATITIS IN RABBITS FOLLOWING IMMUNIZATION WITH HUMAN LIVER PROTEINS. *(E.)* Meyer zum Buschenfelde, K. H.; Kossling, F. K.; Miescher, P. A. (2nd Dept. Med., Univ. Mainz, Germany). *Clin. Exp. Immunol.* 10:99-108, 1972.

See also 2182, 2600, 2780.

Alcoholic Liver Disease

2811 HEPATIC BLOOD FLOW IN ALCOHOLIC LIVER DISEASE MEASURED BY AN INDICATOR DILUTION TECHNIC. *(E.)* Cohn, J. N.; Khatri, I. M.; Groszmann, R. J.; Kotelanski, B. (VA Hosp., Washington, D.C.). *Am. J. Med.* 53(6):704-714, 1972.

Indicator dilution curves recorded from hepatic venous blood after selective injection of ^{131}I-albumin into the hepatic artery were used to calculate hepatic blood flow in 4 normal subjects and 45 patients with alcoholic liver disease. The indicator dilution technique does not depend on hepatocellular function. Therefore hepatic perfusion in acute alcoholic hepatitis patients as well as in extensive chronic liver disease and preterminal hepatic failure, can be quantitated. In 14 patients with acute alcoholic hepatitis, hepatic blood flow was significantly higher (average 1,170 ml/minute/m^2 body surface area) than in normal subjects (average 669 ml/minute/m^2) or in 24 patients with chronic alcoholic liver disease (average 870 ml/min/m^2). In 7 patients with preterminal hepatic failure, hepatic blood flow averaged 982 ml/minute/m^2. The hepatic fraction of cardiac output averaged 24.6% in normal subjects and 25.9% in those with alcoholic hepatitis, but it was significantly reduced in patients with chronic liver disease (average 19.3%) and hepatic failure (average 20.1%). The average hepatic plasma volume also was higher in patients with alcoholic liver disease (average 365 ml) or patients with hepatic failure (average 336 ml). Despite the normal or high hepatic blood flow in most patients with alcoholic liver disease, abnormally high hepatic venous oxygen saturation was indicative of reduced splanchnic oxygen consumption in patients failure compared to the normal subjects. A significant correlation between arteriovenous oxygen difference and hepatic albumin mean transit time suggests that intrahepatic shunting of oxygen could be a factor contributing to impaired hepatic function. The observation that hepatic blood flow is often higher than normal in the presence of severe liver injury is contrary to prior reports.

2812 TRANSIENT INTRAVASCULAR HAEMOLYSIS ASSOCIATED WITH ALCOHOLIC LIVER DISEASE AND HYPERLIPIDAEMIA. *(E.)* Powell, L. W.; Roeser, I. P.; Halliday, J. W. (Dept. Med., Univ. Queensland, oy. Brisbane Hosp., Australia). *Aust. N.Z. J. Med.* (1):39-43, 1972.

A 44 yr old male alcoholic developed severe intravascular hemolysis in association with alcoholic iver disease, hyperlipidemia and anemia. *In vitro* incubation experiments suggested there was a circulating factor in plasma which rendered his own and normal, compatible RBC abnormally susceptible to mechanical damage. The nature of this extracorpusular factor and its relation to hyperlipidemia emains uncertain. The optimum time for its detection would be within the first few days of illness. The isorder resolved spontaneously but recurred 18 months later after another alcoholic bout, when the resence of the abnormal plasma factor was again demonstrated. It is suggested that a spectrum of RBC membrane damage may occur in association with acute alcoholic liver disease, and in its most severe form result in intravascular lysis while less affected cells are sequestered in the spleen.

2813 LYMPHOCYTE TRANSFORMATION AND ALCOHOLIC LIVER INJURY. *(E.)* Sorrell, M. F.; Leevy, C. M. (Coll. Med. Dentistry New Jersey, Newark). *Gastroenterology* 639(6):1020-1025, 1972.

The influence of ethanol and acetaldehyde on phytohemagglutinin transformation of lymphocytes from patients with liver disease was investigated. These substances had no effect on 10 normal subjects, 10 patients with alcoholic fatty liver without necrosis (2 with acute pancreatitis, 1 with alcoholic cardiomyopathy, 4 with steatosis but no fibrosis, 3 with fat accumulation and fibrosis), 12 patients with acute viral hepatitis (2 with positive hepatitis-associated antigenemia), or 12 patients with inactive Laennec's cirrhosis. These substances evoked a significant increase to 3.9 in the stimulation index of lymphocytes from 13 patients with alcoholic hepatitis and 9 patients with chronic active hepatitis, including 3 with hepatitis B-associated antigenemia. Autologous liver homogenates produced an identical degree of stimulation (3.9) for alcoholic hepatitis and a stimulation index of 5.5 in cultures of lymphocytes from chronic active hepatitis patients. Neither ethanol nor autologous liver had any effect when hyaline necrosis was no longer evident in alcoholic hepatitis patients, although a combination of these additives caused an increase in transformation. One such patient who continued to consume alcoholic beverages developed lobular distortion and cirrhosis. These observations indicate that there is altered cell-mediated immunity to alcoholic hepatitis which may contribute to development and/or perpetuation of chronic liver injury.

2814 NATURAL HISTORY OF ALCOHOLIC HEPATITIS. III. HISTOLOGICAL CHANGES. *(E.)* Galambos, J. T. (Woodruff Med. Ctr., Emory Univ., Atlanta, Ga.). *Gastroenterology* 63(6):1026-1035, 1972.

To investigate the direction, type, and duration of histological changes in alcoholic hepatitis and to investigate the relation between parenchymal necrosis and inflammation or steatosis and subsequent fibrosis and cirrhosis, a study was made of 76 patients in whom a diagnosis of alcoholic hepatitis had been established by liver biopsy. Morphological changes were observed in 193 biopsies and in 25 necropsies 0.5-9 yr after the diagnostic biopsy. Of 76 chronic alcoholics, 5 had cirrhosis on their first biopsy. Of 61, 23 developed cirrhosis in 2.8 ± 1.5 yr; 32 still had alcoholic hepatitis, but not cirrhosis after 3.6 ± 2.3 yr; and 6 recovered normal liver. The persistence of alcoholic hepatitis in the 32 patients was associated with continued drinking. Cirrhosis developed in 2 of the 23 during abstinence and very close clinical observation. On 16 patients, 59 serial biopsies and 2 autopsies were performed within 18 months (45 biopsies and 2 autopsies within 8 months). In this group, the severity of parenchymal necrosis and inflammation did not improve during 4 to 5 weeks of or disappeared. Even during abstinence in 11 of these 16 patients, the recovery rate of alcoholic hepatitis was slow; the lesion improved but persisted for 6-12 months in 6 patients who did not develop cirrhosis; liver findings normalized in only 3 of the 11.

2815 QUANTITATION OF PORTASYSTEMIC SHUNTING FROM THE SPLENIC AND MESENTERIC BEDS IN ALCOHOLIC LIVER DISEASE. *(E.)* Groszmann, R.; Kotelanski, B.; Cohn, J. N.; Khatri, I. M. (VA Hosp., Washington, D.C.). *Am. J. Med.* 53(6):715-722, 1972.

2816 ALCOHOL AND INFECTION. *(E.)* Louria, D. B. (New Jersey Coll. Med. Dentistry, Newark). *Triangle* 10(2):57-62, 1971.

2817 HISTOLOGICAL CHANGES IN LIVERS OF INBRED MICE AND RATS AFTER PROLONGED INTAKE OF ALCOHOL: STUDIES ON THE VOLUNTARY INTAKE OF ALCOHOL AND ON ALCOHOLIC HYALINE-LIKE SUBSTANCE. *(Jap.)* Kagawa, M. (Fac. Med., Kyoto Univ. Japan). *Jap. J. Legal Med.* 26(4):227-252, 1972.

2818 PRECURSORS OF PLASMA TRIGLYCERIDE FATTY ACID IN HUMANS. EFFECTS OF GLUCOSE CONSUMPTION, CLOFIBRATE ADMINISTRATION, AND ALCOHOLIC FATTY LIVER. *(E.)* Barter, P. J.; Nestel, P. J.; Carroll, K. F. (John Curtin Sch. Med. Res., Australian Natl. Univ., Canberra). *Metabolism* 21(2):117-124, 1972.

2819 COMPARISONS OF THE LEVELS OF ETHANOL IN BIOLOGICAL MATERIALS IN THE BODY AFTER ALCOHOL INGESTION. *(Jap.)* Kita, T. (Tokyo Med. Coll., Japan). *J. Tokyo Med. Coll.* 29(5):547-563, 1971.

2820 LAMINATED MITOCHONDRIAL INCLUSIONS IN HEPATOCYTES OF LIVER BIOPSIES. *(E.)* Burns, W.; Vander Weide, G.; Chan, C. (VA Hosp., Washington, D. C.). *Arch. Pathol.* 94(1):75-80, 1972.

See also 2126, 2127, 2131, 2132, 2160, 2161, 2163, 2180, 2300, 2505, 2836.

LIVER AND BILIARY TRACT

Cirrhosis

2821 INDIAN CHILDHOOD CIRRHOSIS (ICC): A CYTOCHEMICAL STUDY OF HEPATIC HYALINE. *(E.)* Agarwal, V. P.; Sachdev, K. N.; Chaudhary, V. K. (S.P. Med. Coll., Bikaner, India). *Indian Pediatr.* 9(5):294-298, 1972.

The cytochemical features of hepatic eosinophilic hyaline bodies found in 37 children with Indian childhood cirrhosis were studied. These bodies consisted of a polysaccharide-lipid-protein complex with fractions of cytoplasmic ribonucleoproteins and a diastase-resistant material positive to periodic acid-Schiff (PAS) reagent. They were located in the endoplasmic reticulum and mitochondria of hepatocytes. Except for bearing a close superficial morphologic resemblance, hepatic hyaline in Indian childhood cirrhosis differs from classical Mallory's alcoholic hyaline in a few respects, e.g., Mallory's bodies are devoid of any PAS-positive material and are present in otherwise normal hepatocytes. The eosinophilic hyaline bodies are regarded to be a degenerative process occurring within the liver cells in this disease.

2822 BIOLOGICALLY ACTIVE ANDROGENS AND OESTRADIOL IN MEN WITH CHRONIC LIVER DISEASE. *(E.)* Galvao-Teles, A.; Anderson, D. C.; Burke, C. W.; Marshall, J. C.; Corker, C. S.; Bown, R. L.; Clark, M. L. (St. Bartholomew's Hosp., London, England). *Lancet* 1(7796):173-177, 1973.

Twenty-five men with chronic liver disease were studied. Histological diagnosis included: chronic active hepatitis (5 patients, 23-61 yr); postnecrotic (macronodular) cirrhosis (4 patients, 45-67 yr); alcoholic (micronodular) cirrhosis (8 patients, 48-74 yr); biliary cirrhosis (1 patient, 65 yr); and noncirrhotic intrahepatic portal hypertension (7 patients, 28-67 yr). The plasma levels of unbound (biologically active) 17β-hydroxyandrogens, principally testosterone, were significantly lower than in controls (99 vs. 160 pg/ml, resp.). This fall was most striking in the patients with alcoholic cirrhosis (68 pg/ml). Serum luteinizing hormone was high (2.35 mU/ml) in controls vs. 3.7 mU/ml in patients). Unbound plasma estradiol levels were normal. Plasma sex hormone binding globulin concentrations were raised 2-fold although the albumin levels were reduced. In men with chronic liver disease, increased hepatic sex hormone binding globulin production may cause the fall in plasma unbound 17β-hydroxyandrogen levels and the hypothalamus may respond to this by stimulating increased luteinizing hormone production. Apparently this does not increase Leydig cell production of testosterone enough to return the unbound level to normal. The normal unbound estradiol levels may be maintained because the effect of the fall in plasma albumin on estradiol binding cancels out the opposite effect of a rise in sex hormone binding globulin. Perhaps the combination of normal unbound plasma estradiol and reduced unbound androgen levels may lead to gynecomastia and clinical evidence of hypogonadism in chronic liver disease. The greater reduction in unbound plasma 17β-hydroxyandrogen in alcoholic cirrhosis may be responsible for the higher frequency of gynecomastia and hypogonadism in this form of liver disease.

2823 PRIMARY BILIARY CIRRHOSIS OR SARCOIDOSIS, OR BOTH. *(E.)* Stanley, N. N.; Fox, R. A.; Whimster, W. F.; Sherlock, S.; James, D. G. (Roy. Free Hosp., London, England). *N. Engl. J. Med.* 287(25):1282-1284, 1972.

Findings in 2 patients with primary biliary cirrhosis and widespread granulomas have been compared to clinical, histological, and immunological features of sarcoidosis. A 41-yr-old woman developed pruritus and jaundice during pregnancy and was found to have organized granulomas in the portal and central zones of the liver. Depression of delayed-type hypersensitivity and impairment of *in vitro* lymphocyte transformation with phytohemagglutinin developed later. She died 4 yr after onset following surgery for control of massive hematemesis. Autopsy showed no liver granulomas, but inactive Stage 4 primary biliary cirrhosis. Postmortem examination of the liver in the second patient, a 49-yr-old woman, showed Stage 4 primary biliary cirrhosis without hepatic granulomas; the portal vein was thrombosed. The patient's history included progressive pruritus and jaundice which developed 1 yr prior to a portacaval anastomosis performed for recurrent hematemesis. In both cases the existence of noncaseating granulomas in the lung, liver, spleen, and lymph nodes suggested multi-system sarcoidosis. Xanthomas, hepatomegaly, hyperbilirubinemia, hypercholesterolemia, and finger-clubbing, some of which were present in these 2 patinets, are not observed in sarcoidosis but are typical of primary biliary cirrhosis. The Kveim-Siltzbach and serum mitochondrial antibody tests are invaluable in distinguishing between these 2 diseases: the former is positive only in sarcoidosis and the latter in primary biliary cirrhosis.

2824 LIVER DISEASE IN ADULTS WITH ALPHA$_1$-ANTITRYPSIN DEFICIENCY. *(E.)* Berg, N. O.; Eriksson, S. (Dept. Pathol., Univ. Lund, Sweden). *N. Engl. J. Med.* 287(25):1264-1267, 1972.

Examination of liver tissue obtained at autopsy (13 cases) and by biopsy (1 case) from patients (20-85 yr old) with homozygous α_1-antitrypsin deficiency showed that the hepatocytes contained periodic-acid-Schiff-positive globular material similar to that seen in infantile cirrhosis with α_1-antitrypsin deficiency. Five of the adult patients had cirrhosis, and 3 fibrosis of the liver; of these 8, all over 50 yr old, 3 also had hepatomas. Twelve of the 13 autopsy cases had either bullous or panacinar emphysema. The findings suggest that in α_1-antitrypsin deficiency liver disease and emphysema are linked to the same genetic defect.

2825 CHOLERESIS INDUCED BY SECRETIN: DISTINCTLY INCREASED RESPONSE IN CIRRHOTICS. *(E.)* Bode, C.; Zelder, O.; Goebell, H.; Neuberger, H. O. (Dept. Med., Univ. Marburg/Lahn, Germany). *Scand. J. Gastroenterol.* 7(8):697-699, 1972.

The effect of secretin infusion on choleresis was studied in 3 female patients (age 59-65 yr) with cirrhosis of the liver and 6 cholecystectomized patients (2 male, 4 female; 38-64 yr) with no signs of liver disease. All patients had undergone biliary surgery with a balloon-equipped T-tube left in the common bile duct. In the cirrhotics, resting bile flow was slightly higher than in the control group. The response of hepatic bile to secretin infusion was markedly higher in the cirrhotics (5-10-fold). In addition, in patients with liver cirrhosis, secretin caused a pronounced increase of bicarbonate concentration with an equimolar fall in chloride concentration in the bile, while little change was noted in the group with normal livers. The marked stimulatory effect of secretin on duodenal juice production in cirrhotics observed in earlier studies on exocrine pancreatic function can be explained by the high volume response of bile flow reported here. It appears that increased sensitivity of the bile duct epithelia in the cirrhotic liver to secretin stimulation is the most important factor for this effect.

2826 THORACOBILIA: A SURGICAL COMPLICATION OF HEPATIC ECHINOCOCCOSIS AND AMEBIASIS. *(E.)* Amir-Jahed, A. K.; Sadrieh, M.; Farpour, A.; Azar, H.; Namdaran, F. (Pahlavi Univ. Sch. Med., Shiraz, Iran). *Ann. Thorac. Surg.* 12(2):198-205, 1972.

A study was made of 10 patients (7 men and 3 women, aged 18-56 yr) who developed bronchobiliary fistulas as a result of hepatic echinococcosis (5 cases) or amebiasis (5 cases). All patients presented with bile expectoration, hepatomegaly, chill, and fever. Simple cysts of *Echinococcus granulosus* were present in the livers of 4 patients and multiple cysts, in 1 patient. These cysts caused only bronchobiliary fistulas without evidence of pleural hydatid disease. Amebic abscesses (single in 3 patients, double in 2) were large cavities containing chocolate-colored pus. These abscesses caused both pleurobiliary and bronchobiliary fistulas. The course was fulminating, ending in death within 48 hr after hospitalization, in 2 patients with amebic liver disease; the other 8 patients had a chronic course. In all cases, cysts and abscesses were drained transabdominally, and large doses of antibiotics were administered; 3 patients also received specific chemotherapy with emetine. Major postoperative complications, which occurred in 8 cases, included bronchopneumonia, empyema, amebic pneumonitis, and cutaneous amebic fistulization at the site of abdominal drainage. Death occurred in 3 patients with amebiasis and in 2 with echinococcosis; 4 of these 5 patients died from massive aspiration of bile and 1 from bronchopneumonia.

2827 MANAGEMENT OF HEMORRHAGE FROM ESOPHAGEAL VARICES USING THE ESOPHAGOSCOPIC SCLEROSING METHOD. *(E.)*

Raschke, E.; Paquet, K. T. (Barinbek Gen. Hosp., Homburg, Germany). *Ann. Surg.* 177(1):99-102, 1973.

Using endoscopic control, esophageal varices were sclerosed in 30 patients by injecting submucosa adjacent to the varices with 2 ml of 5% Varicocid (alkaline salts of the fatty acids of cod-liver oil and 2% benzyl alcohol). No more than 10 ml of Varicocid was used at one session and, if necessary, the procedure was repeated 2-3 times at 3-day intervals. This technique was used to control acute bleeding in 12 patients (9 with cirrhosis and portal hypertension, 2 with thrombosed shunts, and 1 with bleeding after a distal splenorenal shunt) and to prevent bleeding in 18 patients (13 with decompensated cirrhosis, 1 with a thrombosed proximal splenorenal shunt, 2 with thrombosed mesocaval shunts, and 2 who had undergone splenectomy and had thrombosed portal veins). Bleeding was controlled immediately in all but 1 patient, and radiological evidence of a decrease in varicosities was obtained. Six patients with acute bleeding died: 4 of hepatic coma, 1 of myocardial infarction and aneurysm, and 1 of esophageal necrosis with pyothorax. Of the 18 patients treated during a free interval, 4 died in hepatic coma and 2 from variceal bleeding in the fornix. Eighteen patients were alive 3 months to 3 yr after the final sclerosing treatment.

2828 CIRRHOSIS OF THE LIVER ASSOCIATED WITH α_1-ANTITRYPSIN DEFICIENCY. *(E.)*

Ishak, K. G.; Jenis, E. H.; Marshall, M. L.; Bolton, B. H.; Battistone, G. C. (Armed Forces Inst. Pathol., Washington, D.C.). *Arch. Pathol.* 94(5):445-455, 1972.

Clinical, laboratory, and light and electron microscope findings made on hepatic biopsy specimens from a 20-yr-old woman homozygous for α_1-antitrypsin deficiency are reported. The patient's 19-yr-old sister is also a homozygote. The levels of α_1-antitrypsin of the parents are in the heterozygous range, and the father has a history of pulmonary emphysema and chronic bronchitis. The patient had a multilobular cirrhosis characterized by multiple cytoplasmic acidophilic bodies in hepatocytes at the periphery of pseudolobules. The bodies were strongly positive when stained with periodic acid-Schiff reagent and resisted diastase digestion. Ultrastructurally, the inclusions, composed of a central osmophilic core surrounded by an electron-lucent halo, were situated within cisternae of endoplasmic reticulum. The liver contained a larger than normal amount of copper, as demonstrated cytochemically and quantitated by neutron activation analysis.

2829 LUNG PERFUSION SCANNING IN HEPATIC CIRRHOSIS. *(E.)*

Stanley, N. N.; Ackrill, P.; Wood, J. (Hosp. Univ. Pennsylvania, Philadelphia). *Br. Med. J.* 4(5841):639-643, 1972.

Lung scans were obtained in 12 patients with cirrhosis and of these 12, 6 also had arterial hypoxemia. The types of cirrhosis included: active chronic cirrhosis (3), cryptogenic cirrhosis (4), alcoholic cirrhosis (2), hepatic fascioliasis (1), and primary biliary cirrhosis (2). Abnormal lung perfusion scans, obtained with radioactively labeled macroaggregated albumin particles, were found in 5 of the 6 patients with cirrhosis and arterial hypoxemia. None had clinical evidence of cardiopulmonary disease or signs of pulmonary embolism on arteriography. The scan defects are probably caused by a disorder of the pulmonary microvasculature, which may show regional variation in severity.

2830 THE RECOGNITION OF HEMOLYTIC DISEASE IN PATIENTS WITH PORTAL CIRRHOSIS. *(E.)*

Sherwood, W. C. (Penn-Jersey Regional Red Cross Blood Program, Philadelphia, Pa.). *Am. J. Clin. Pathol.* 57(5):618-624, 1972.

To determine the reliability of common laboratory tests as indicators of hemolytic disease in patients with chronic liver disease, 22 patients with alcoholic liver disease were studied. Erythrocyte survival was compared with hemoglobin level, reticulocyte count, serum bilirubin, serum lactic acid dehydrogenase, and serum haptoglobin. Individual studies which were quite reliable in indicating hemolytic disease in such patients were the indirect:total bilirubin ratio and serum haptoglobin levels. A stepwise regression analysis disclosed the indirect:total bilirubin ratio, total bilirubin, and haptoglobin values are a reliable combination of studies for diagnosis of hemolytic disease. Serum haptoglobin levels did not correlate with other measurements of hepatic protein synthesis (albumin, fibrinogen, prothrombin times). This study suggests that haptoglobin synthesis can remain intact in patients with chronic liver disease and that serum levels are a reliable guide for the diagnosis of hemolytic conditions in such patients.

2831 SERUM MUCOPROTEINS IN INDIAN CHILDHOOD CIRRHOSIS AND INFECTIVE HEPATITIS. *(E.)* Bhoraskar, S. N.; Singh, S. D.; Thakor, P. S.; Pohowalla, J. N. (S.S. Med. Coll., Rewa, India). *Indian Pediatr.* 19(1):20-22, 1972.

2832 THE NATURAL HISTORY OF ESOPHAGEAL VARICES: A RETROSPECTIVE STUDY OF 224 CASES WITH LIVER CIRRHOSIS. *(E.)* Olsson, R. (Sahlgrenska Hosp., Gothenburg, Sweden). *Digestion* 6(2):65-74, 1972.

2833 TREATMENT OF HEPATIC CIRRHOSIS WITH XANTHINOL NICOTINATE: RESULTS OF A DOUBLE-BLIND TEST. *(Ger.)* Schnack, H. (Wilhelmine Hosp., Vienna, Austria). *Munch. Med. Wochenschr.* 114(10):460-462, 1972.

2834 SERUM α_2H [GLOBULIN] IN MALIGNANT BLOOD DISEASES AND CIRRHOSIS. CHANGES IN ITS VALUES. *(Fr.)* Martin, J. P.; Charlionet, R.; Ropartz, C. (Ctr. Blood Transfusion Hum. Genet., Rouen, France). *Presse Med.* 51(51):2313-2316, 1971.

2835 CIRRHOSIS IN DIABETICS. *(Sp.)* Bellomo, J. A.; Garcia Dadoni, L. (Fac. Med., Buenos Aires, Argentina). *Prensa Med. Argentina* 59(10):387-396, 1972.

2836 STUDY OF THE SURVIVAL AND CAUSES OF DEATH AFTER GASTROINTESTINAL BLEEDING IN 236 ALCOHOLIC PATIENTS WITH CIRRHOSIS. *(Fr.)* Paris, J.; Gerard, A.; Paris, J. C.; Delmotte, J. S.; Marechal, A. (no affil.). *Lille Med.* 17(4):593-599, 1972.

2837 ABNORMAL ASPIRIN METABOLISM IN PATIENTS WITH CIRRHOSIS AND ITS POSSIBLE RELATIONSHIP TO BLEEDING IN CIRRHOTICS. *(E.)* Menguy, R.; Desbaillets, L.; Okabe, S.; Masters, Y. F. (Univ. Rochester Sch. Med. Dentistry, N. Y.). *Ann. Surg.* 176(3):412-418, 1972.

2838 THE EFFECT OF PREDNISONE ON SERUM CHOLESTEROL IN PATIENTS WITH CIRRHOSIS OF THE LIVER. *(E.)* Boberg, F.; Hattel, T.; Nielsen, O. E. (Frederiksberg Hosp., Copenhagen, Denmark). *Scand. J. Gastroenterol.* 7(8):723-726, 1972.

2839 MANAGEMENT OF HEPATIC AND PORTOCAVAL SHUNT SURGERY. *(E.)* Law, G. T. (Gen. Hosp., Kuala Lumpur, Malaysia). *J.R. Coll. Surg. Edinb.* 17(2):90-92, 1972.

2840 ABNORMAL CARBOHYDRATE METABOLISM IN PATIENTS WITH LIVER CIRRHOSIS: IN VITRO STUDY. *(E.)* Dzurikova, V.; Niederland, T. R.; Brixova, E.; Dzurik, R.; Hupkova, V.; Holoman, J. (Comenius Univ. Med. Sch., Bratislava, Czechoslovakia). *Diabetologia* 8(3):202-205, 1972.

2841 VENO-OCCLUSIVE DISEASE OF THE LIVER. *(E.)* Kapoor, S. K.; Singh, M.; Kumar, V. (All India Inst. Med. Sci., New Delhi). *Indian Pediatr.* 9(4):225-228, 1972.

2842 EARLY AND LATE MORBIDITY OF PORTASYSTEMIC SHUNTS INCLUDING EXPERIENCE WITH SEVEN H-GRAFTS. *(E.)* Smith, III, R. B.; Perdue, Jr., G. D. (Emory Univ. Sch. Med., Atlanta, Ga.). *Am. J. Gastroenterol.* 58(4):396-410, 1972.

2843 HEPATIC CIRCULATION AFTER SIDE-TO-SIDE PORTACAVAL SHUNT IN DOGS: VELOCITY PATTERN AND FLOW RATE CHANGES STUDIED BY ULTRASONIC VELOCIMETER. *(E.)* Loisance, D. Y.; Peronneau, P. A.; Pellet, M. M.; Lenroit, J. P. (Broussais Hosp., Paris, France). *Surgery* 73(1):43-52, 1973.

2844 SELECTION OF PATIENTS WITH CIRRHOSIS OF THE LIVER FOR SHUNT SURGERY. *(E.)* Bengmark, S.; Brandt, K. H.; Hobbs, K. E. F.; Kardel, T.; Martini, G. A.; Opolon, P.; Preisig, R.; Sherlock, S. (Univ. Lund, Sweden). *Scand. J. Gastroenterol.* 7(8):679-681, 1972.

See also 2596, 2600, 2752.

LIVER AND BILIARY TRACT

Gallbladder and Biliary Tract Diseases

2845 AGENESIS OF GALLBLADDER WITH COMMON DUCT STONES. *(E.)* Duckler, L. (Bess Kaiser Hosp., Portland, Ore.). *Am. J. Dig. Dis.* 17(12):1127-1130, 1972.

A 77-yr-old woman with severe abdominal pain and jaundice was found at laparotomy to have stones in the common bile duct although she had agenesis of the gallbladder. An oral cholecystogram, taken 1 week before jaundice developed, failed to reveal the gallbladder. A laparotomy showed no evidence of a normal gallbladder or cystic duct. The common bile duct was enlarged, thickened, and inflamed. It was opened and stones of the common mixed variety (68.5% cholesterol, 16.8% calcium bilirubinate, and 14.7% calcium carbonate) were removed. Proof that stones can form in the common bile duct with or without a gallbladder confirms that some postcholecystectomy patients, carefully searched for stones in the common bile duct and with negative cholangiograms, subsequently develop stones in the common duct.

2846 THE FORMATION OF ABNORMAL BILE AND CHOLESTEROL GALLSTONES FROM DIETARY CHOLESTEROL IN THE PRAIRIE DOG. *(E.)* Brenneman, D. E.; Conner, W. E.; Forker, E. L.; DenBesten, L. (Univ. Iowa Coll. Med., Iowa City). *J. Clin. Invest.* 51(6): 1495-1503, 1972.

To study the pathogenesis of cholesterol gallstones, 24 adult male prairie dogs were fed a high cholesterol, egg yolk diet (41% fat, 44% carbohydrate, and 15% protein). Thirteen control animals received a cholesterol-free diet. All animals fed the egg yolk diet developed multiple gallstones within 2-6 months. These stones contained cholesterol (77 ± 14% by dry weight). No stones occurred in the control group. Changes developed in the chemical composition of bile from animals fed egg yolks. The cholesterol concentration increased significantly in hepatic and gallbladder bile, while the molar ratios of bile acid: cholesterol and phospholipid:cholesterol decreased. The predominant bile acid shifted from cholic acid (78% of the total bile acids) to chenodeoxycholic acid (60% of the total in hepatic bile; 68% in gallbladder bile). The high cholesterol diet increased cholesterol secretion by the liver and increased bile flow in animals with cannulas in their common bile ducts. In animals fed the egg yolk diet for 2 months, cholesterol-4-^{14}C was included in the daily diet for the next 4 months to establish an isotopic steady state. At autopsy the mean specific activity of cholesterol was similar in serum, liver, hepatic bile, gallbladder bile, and gallstones, showing that gallstone cholesterol apparently equilibrated constantly throughout the study and was not sequestrated as a static pool. Thus, the high cholesterol, egg yolk diet caused "abnormal bile" secretion which led to precipitation of cholesterol from micellar solution. The increase in bile cholesterol, relative to bile acid and phospholipid, favored stone formation. This dietary induction of cholesterol gallstones provides a unique animal model, similar to but not identical with human cholelithiasis.

2847 PRIMARY CARCINOMA OF THE GALLBLADDER: REVIEW OF 28 CASES. *(E.)* Klein, J. B.; Finck, F. M. (Queen of Angels Hosp., Los Angeles, Calif.). *Arch. Surg.* 104(6):769-772, 1972.

A review of 28 cases of cancer of the gallbladder seen in 10 yr showed a sex distribution of 23 females and 5 males. The 28 patients had adenocarcinoma (26), anaplastic carcinoma (1), and adenoacanthoma (1). Of these 28, 17 patients had a 6-month history of biliary symptoms or had evidence of stones in x-ray examinations, and 26 had instances of gallstones. The average age for this series was 67.1 yr; range was 54-85 yr. Nineteen patients were of European descent, 8 were Latin-Americans, and 1 was of Afro-American extraction. There was a decidedly high incidence among Mexican-American women. In 6 of the 8 patients subjected to simple cholecystectomy, the gallbladder was not opened at the time of operation and the cancer was not then recognized. Two of these patients are living more than 5 yr later. Opening of a gallbladders at the time of operation is recommended so that more extensive resection can be done where appropriate.

2848 EXPERIMENTAL PRODUCTION OF CHOLANGITIS BY 1,4-PHENYLENEDIISOTHIOCYANATE. *(E.)* Selye, H.; Szabo, S. (Inst. Med. Exp. Surg., Univ. Montreal, Canada). *Arch. Pathol.* 94(6):486-488, 1972.

Experiments on 20 female Sprague-Dawley rats indicate that 1,4-phenylenediisothiocyanate (PDT), (5 mg in 1 ml water/day by stomach tube for 5 days) rapidly elicits toxic cholangitis which, like that previously obtained with saccharated ferric oxide, affects both extrahepatic and intrahepatic bile ducts. Lesions may spread to the pancreatic duct and its surroundings. Within a few days, PDT leads to enormous dilatation of the common bile duct with intense inflammatory sclerosis of its walls, shedding of the epithelial lining, and precipitate formation in the stagnating bile. Often, large ulcers develop at the entry of the ampulla of Vater into the duodenum. This may be associated with biliary obstruction, but common bile duct dilatation appears to precede the development of visible changes in the duodenal mucosa around the papilla of Vater. When the dosage was reduced to 3 mg in 1 ml oil, the results were more pronounced and the disease progressed more rapidly. The intense stimulating action of PDT on the proliferation of bile-duct epithelium suggests a possible carcinogenic effect.

2849 INTERMITTENT SECRETION OF ABNORMAL BILE IN PATIENTS WITH CHOLESTEROL GALL STONES. *(E.)* Smallwood, R. A.; Jablonski, P.; Watts, J. M. (Austin Hosp., Univ. Melbourne, Australia). *Br. Med. J.* 4(5835):263-266, 1972.

Gallbladder and hepatic bile was sampled from 66 patients undergoing elective operations on the biliary tract. Of these, 51 patients had cholesterol gall stones, but only 59% of these had bile which was supersaturated with cholesterol. Of the other 15 patinets, 6 had pigment stones and 9 had no evidence of gall stone disease.

Repeated sampling of hepatic bile from patients with T-tubes showed that the secretion of supersaturated bile was intermittent. Thus, it is impossible to separate patients with cholesterol stones from controls simply by examining the lipid composition of their bile. Since cholesterol gall stones form when the bile is supersaturated only intermittently with cholesterol, the gallbladder may also take part in their formation.

2850 GALLSTONE DISSOLUTION IN MAN USING CHENODEOXYCHOLIC ACID. *(E.)* Bell, G. D.; Whitney, B.; Dowling, R. H. (Roy. Postgrad. Med. Sch., London, England). *Lancet* 2(7789):1213-1216, 1972.

Chenodeoxycholic acid (750-1000 mg/day p.o.) was given to 22 patients (18 women and 4 men, aged 29-75 yr; mean age 49) with presumed cholesterol gall stones. Of these, 19 had radiologically "functioning" gallbladders and 3 did not. Except for 2 patients who had episodes of biliary colic but refused surgery, all patients were either asymptomatic or had only mild and occasional biliary-tract symptoms. After 3 months of treatment, bile composition improved in 10 of 15 patients tested, remained unchaged in 4, and deteriorated in 1. Treatment significantly reduced the molar ratio of cholesterol and increased the mean ratio of bile-salts + phospholipids to cholesterol. Microcrystals of cholesterol, which were present in the bile of 6 of these 15 patients before treatment, disappeared after therapy. Gall stones completely disappeared in 3 of 12 patients with "functioning" gallbladders who were treated for 6 months. A reduction in the size of gallstones occured in 3 other patients with medium-sized radiolucent stones after 6 months of therapy, while no change in gall stone size has occurred yet in 4 patients with large radiolucent stones and 2 with radio-opaque stones. Treatment had no effect on serum cholesterol levels, but significantly reduced serum triglyceride levels after 3 months. The only significant abnormality in liver function was a slight increase in isocitrate dehydrogenase levels. Treatment of 5 more patients with chenodeoxycholic acid for 6 months dissolved gall stones in 1, reduced their size in 1, and had no effect so far in 3.

2851 INCREASED PREVALANCE OF CHOLELITHIASIS IN MEN INGESTING A SERUM-CHOLESTEROL-LOWERING DIET. *(E.)* Sturdevant, R. A. L.; Pearce, M. L.; Dayton, S. (VA Wadsworth Hosp., Los Angeles, Calif.). *N. Engl. Med. J.* 288(1): 24-27, 1973.

The long-term effect of feeding a diet high in unsaturated fat, low in saturated fat, low in cholesterol, and high in plant sterol on cholelithiasis in man, was studied in autopsy records from a controlled clinical trial of dietary prevention of complications of atherosclerosis. The average daily compositions of the experimental diet was: protein 97 g, fat 108 g, iodine value of fat 102.4, cholesterol 365 mg, and β-sitosterol 215 mg. Autopsied men who ate more than 33% of the experimental meals served from entry into the trial to death were more likely to have gallstones (34%) than control subjects (14%). The proportion of men in the experimental diet group with gallstones at autopsy was directly correlated with number of trial meals eaten. Gallstones were more common at autopsy in men 9.1 kg or more overweight (43%) than in the remaining men (16%) in both diet groups. The data suggest that some property of the experimental diet (high ratio of polyunsaturated fat to saturated fat or high ratio of plant sterol to cholesterol or both) promotes gallstone formation.

2852 SERUM ALKALINE PHOSPHATASE IN INFANTS WITH OBSTRUCTIVE JAUNDICE: RELATION TO VITAMIN D SUPPLEMENTATION. *(E.)* Bastis-Maounis, B.; Matsaniotis, N.; Maounis, F. (Dept. Pediatr., Athens Univ., Greece). *J. Pediatr.* 80(1):68-72, 1973.

Total activity of serum alkaline phosphatase was determined in biliary atresia (13 infants, 2-16 weeks old), in hepatitis (27 infants, 1-16 weeks old), and in 35 normal control infants (1-17 weeks old). Values ranged from normal to significantly elevated in infants with biliary atresia (19-91 King-Armstrong U) and those with hepatitis (10.5-84 King-Armstrong U). In normal infants serum alkaline phosphatase activity ranged from 8.1-28.3 King-Armstrong U. In infants with biliary atresia and in those with hepatitis, normal serum alkaline phosphatase values and normal x-rays of wrist epiphyses were observed when those infants were receiving vitamin D in daily doses exceeding 2,4000 I.U. from the 3rd to 4th weeks of age. In contrast, high serum alkaline phosphatase values were found in infants with obstructive jaundice and radiologic or other biochemical evidence of rickets, who were receiving vitamin D in daily doses of 100 to 400 IU. It seems probable that high values of serum alkaline phosphatase in association with liver disease in infants reflects, at least in part, a secondary vitamin D deficiency.

2853 BILE COMPOSITION AT AND AFTER SURGERY IN NORMAL PERSONS AND PATIENTS WITH GALLSTONES: INFLUENCE OF CHOLECYSTECTOMY. *(E.)* Shaffer, E. A.; Braasch, J. W.; Small, D. M. (Boston Univ. Med. Ctr., Mass.). *N. Engl. J. Med.* 287(26): 1317-1322, 1972.

The biliary lipid composition of hepatic and gallbladder bile obtained at surgery was compared in 11 patients with cholesterol gallstones and in control subjects (10 with pigment stones and 10 without biliary disease). Indwelling T-tubes allowed daily postoperative collections of bile for 2-20 weeks in 7 patients with cholesterol gallstones and in 11 controls. Patients with cholesterol gallstones secreted supersaturated hepatic bile clearly different from that in controls at surgery; and, after cholecystectomy, produced bile with a cholesterol composition identical to that of controls without gallstones. Thus, the gallbladder is essential for continuous production of lithogenic hepatic bile. Bile-salt synthesis was determined from dependent T-tube drainage in 10 patients with cholesterol stones. Under the stimulus of an interrupted enterohepatic circulation, a 4-fold increase occurred in hepatic bile-salt synthesis. Since synthesis can increase in response to loss, the hepatic defect appears to be in feedback inhibition and requires the presence of the gallbladder.

2854 SULFATED AND NONSULFATED BILE ACID IN HUMAN SERUM. *(E.)* Makino, I.; Nakagawa, S.; Shinozaki, K.; Mashimo, K. (Hokkaido Univ. Sch. Med., Sapporo, Japan). *Lipids* 7(11):750-752, 1972.

Sulfated bile acid in serum of 5 healthy persons and 6 patients with hepatobiliary diseases was detected by using an Amberlite XAD-2 column for extraction of bile acid and a Sephadex LH-20 column for separation of sulfated bile acid (sulfate of either taurine or glycine conjugate), and nonsulfated bile acid (taurine and glycine conjugate). The 6 patients had acute hepatitis (1), chronic hepatitis (1), cirrhosis (1), papilla of Vater carcinoma (1), primary biliary cirrhosis (1), and metastatic carcinoma of the liver (1). They were 2 females and 4 males, aged 27-66 yr. The values of nonsulfated bile acid determined in this study were similar to the level of total serum bile acid reported by previous workers. A small amount of sulfated bile acid was found in normal serum, and the percentage of sulfated bile acid was about 10%. In patients with hepatobiliary diseases, both levels of sulfated and nonsulfated bile acid in serum rose, but sulfated bile acids did not increase parallel to the level of nonsulfated bile acids. A significant increase of serum-sulfated bile acid could be observed in patients with cholestasis, while a slight elevation was noted in patients with chronic hepatocellular insufficiency. The percentage of sulfated bile acid was 1.8-21.2% in patients with hepatobiliary diseases; that of sulfated dihydroxycholanoic acid was 32.6% in metastatic carcinoma of the liver 29.7% in biliary cirrhosis, 18.8% in papilla of Vater carcinoma, 6.0% in cirrhosis, and 3.1% in chronic hepatitis. Since there is a large discrepancy between sulfated bile acid concentrations in urine and serum, and the bile acid composition of serum sulfate differed from that of urinary sulfate, sulfated bile acid may be more readily excreted in urine than the nonsulfated form.

2855 ALIMENTARY PRODUCTION OF GALLSTONES IN HAMSTERS. *(E.)* Dam, H.; Prange, I.; Sondergaard, E. (Polytechnic Inst., Dept. Biochem. Nutr., Copenhagen, Denmark). *Z. Ernaehrungswiss.* 11(2):80-94, 1972.

2856 CARCINOMA ARISING IN A CHOLEDOCHAL CYST. *(E.)* Weber, B. B.; Soler, F. J.; Font, R. G.; Nance, F. C. (Louisiana State Univ. Sch. Med., New Orleans, La.). *Am. J. Dig. Dis.* 16(11):1019-1025, 1971.

2857 CHOLECYSTOKININ CHOLECYSTOGRAM IN THE DIAGNOSIS OF THE CYSTIC DUCT SYNDROME. *(E.)* Conte, V. P.; Pinotti, H. W.; de Brito, T.; Pontes, J. F. (Clin. Hosp., Sao Paulo, Brazil). *Am. J. Dig. Dis.* 16(11):971-975, 1971.

2858 METABOLIC ASPECTS OF TRACE METAL CONTENT OF GALLSTONES AND GALLBLADDERS. *(E.)* Markkanen, T.; Aho, A. J. (Dept. Med. Microbiol., Univ. Turku, Finland). *Acta Chir. Scand.* 138:301-305, 1972.

2859 THE METABOLIC SEQUENCE FOR THE OCCURRENCE OF AN ANOMALOUS BILE ACID, 12-KETO-CHENODEOXYCHOLIC ACID, FOUND IN THE BILE OF HEPATOBILIARY DISEASED PATIENTS. *(E.)* Kikuchi, H. (Sch. Med., Hiroshima Univ., Japan). *J. Biochem.* 72(1):165-172, 1972.

2860 ATRESIA OF THE BILIARY TRACT: PRESENT STATUS. *(E.)* Savino, L.; Bragheri, R.; Verga, G. (Dept. Surg., Univ. Pavia, Italy). *J. Abdominal Surg.* 14(6):106-112, 1972.

2861 DIAGNOSIS AND TREATMENT OF "ASYMPTOMATIC" COMMON BILE DUCT STONES. *(E.)* Staffen, A.; Staudacher, M. (Med. Sch., Univ. Vienna, Austria). *J. Abdominal Surg.* 14(5):89-91, 1972.

2862 BILIARY TRACT DISORDERS AND SICKLE CELL DISEASE. *(E.)* Flye, M. W.; Silver, D. (Duke Univ. Med. Ctr., Durham, N.C.). *Surgery* 72(3):361-367, 1972.

2863 VARIATIONS IN TOTAL SERUM BILIRUBIN AND ALKALINE PHOSPHATASE IN THE NORMAL POSTOPERATIVE CHOLECYSTECTOMY COURSE. *(E.)* Schmidt, F. R.; McCarthy, J. D. (Lovelace Clin., Albuquerque, N. M.). *Am. J. Surg.* 124(6):794-797, 1972.

2864 EOSINOPHILIC INFILTRATION OF THE GALLBLADDER. *(E.)* Fox, H.; Mainwaring, A. R. (Dept. Pathol., Univ. Manchester, England). *Gastroenterology* 63(6):1049-1052, 1972.

2865 MORTALITY FOLLOWING GALLBLADDER SURGERY: A STUDY OF 3,257 CHOLECYSTECTOMIES. *(E.)* Boquist, L.; Bergdahl, L.; Andersson, A. (Dept. Pathol., Univ. Umea, Sweden). *Surgery* 71(4):616-624, 1972.

2866 GRANULAR CELL TUMORS OF THE BILIARY TRACT. *(E.)* LiVolsi, V. A.; Perzin,
K. H.; Badder, E. M.; Price, Jr., J. B.; Porter,
M. (Columbia Univ. Coll. Physicians Surg., New
York). *Arch. Pathol.* 95(1):13-17, 1973.

2867 REMOVAL OF A RETAINED BILIARY STONE WITHOUT REOPERATION. *(E.)* Baker, J.
.; Wettlaufer, J. N.; Chisholm, D. P.; Schaller,
. T. (Madigan Gen. Hosp., Tacoma, Wash.). *Arch.*
urg. 104(5):702-703, 1972.

868 ASCARIASIS OF THE BILIARY SYSTEM. *(E.)* Pfeffermann, R.; Floman, Y.; Rozin, R. R.
Hadassah Univ. Hosp., Jerusalem, Israel). *Arch.*
urg. 105(1):118-120, 1972.

869 GALL-STONES UNDER ATTACK. *(E.)* Stock, S. (Weddel Pharmaceuticals, London,
ngland). *New Scientist* 56(826):738-740, 1972.

870 CHOLANGIOGRAPHIC MANIFESTATIONS OF ACUTE BILIARY COLIC. *(E.)* Sullivan,
. J.; Eaton, Jr., S. B.; Ferrucci, Jr., J. T.;
reyfuss, J. R.; Sloan, R. W. (Harvard Med. Sch.,
oston, Mass.). *N. Engl. J. Med.* 288(1):33-35, 1973

871 CYST OF THE COMMON BILE DUCT IN A 7-YEAR-OLD BOY. *(Rus.)* Mikuliak, V. G.;
ernitskaia, N. S.; Borisiuk, I. I. (Ternopol
ed. Inst., USSR). *Pediatriia* (6):80, 1972.

872 COMPRESSION OF THE COMMON BILE DUCT IN ACUTE CHOLECYSTITIS. *(E.)* Nolan, D. J.;
spiner, H. J. (United Bristol Hosp., England).
. J. Radiol. 45(539):821-824, 1972.

2873 CALCIFYING PRIMARY MUCUS-PRODUCING ADENOCARCINOMA OF THE GALL-BLADDER. *(E.)* Parker, G. W.; Joffe, N. (Beth Israel Hosp., Boston, Mass.). *Br. J. Radiol.* 45(534):468-469, 1972.

2874 ACUTE ACALCULOUS CHOLECYSTITIS WITH NORMAL CHOLECYSTOGRAM. REPORT OF A CASE. *(E.)* Johnson, J. W. (no affil.). *J. Ky. Med. Assoc.* 69(7):510-511, 1971.

2875 CHOLECYSTO-GASTROCOLIC FISTULA. *(E.)* Piedad, O. H.; Walczak, P. M. (State Univ. New York, Buffalo). *N.Y. State J. Med.* 72(3):388-390, 1972.

2876 EXPERIMENTAL BILIARY OBSTRUCTION AND STRESS ULCER FORMATION. *(E.)* Mullane, J. F.; Ritchie, Jr., W. P.; Solis, R. T.; Wilfong, R. G.; Fischer, R. P. (Walter Reed Army Inst. Res., Washington, D.C.). *J. Surg. Res.* 12(3):180-184, 1972.

2877 EFFECT OF CHOLESTYRAMINE ON COMPOSITION OF DUODENAL BILE IN OBESE HUMAN SUBJECTS. *(E.)* Wood, P. D.; Shioda, R.; Estrich, D. L.; Splitter, S. D. (Dept. Med., Stanford Univ., Calif.). *Metabolism* 21(2):107-116, 1972.

2878 BLUNT GALL-BLADDER INJURY. *(E.)* Solheim, K. (Ulleval Hosp., Oslo, Norway). *Br. J. Accid. Surg.* 3(4):246-248, 1972.

See also 2042, 2228, 2231, 2250, 2254, 2259, 2260, 2280, 2364, 2528, 2797, 2900, 2911, 2928, 2936, 2959.

GENERAL

879 CONTROL OF GASTROINTESTINAL BLEEDING. *(E.)* LeVeen, H. H.; Falk, G.; Diaz, C.;
nkoop, B. J.; Piccone, V. A.; Yarnoz, M. D.;
angsam, A. A.; Nelson, J. H.; Pedowitz, W. J.;
elfasky, R. B. (VA Hosp., Brooklyn, N.Y.). *Am.*
Surg. 123(2):154-159, 1972.

tragastric and i.p. administration of norepine-
rine to 18 patients with severe upper gastro-
testinal bleeding caused by postoperative gastrec-
my, stress ulceration, gastric cancer, duodenal
cer, cirrhosis, and mild ascites resulted in the
ssation of bleeding in 12 cases. Both routes
administration resulted in norepinephrine absorp-
on into the portal circulation and subsequent
activation by the liver. Intestinal and gastric vasoconstriction were produced without the danger of systemic effects or anoxia to the bowel. The vasoconstriction produced by either the intragastric or i.p. route was sufficient to cause hemostasis in an otherwise fatal hemorrhage. In a simulated bleeding ulcer model, 15 out of 17 heparinized control dogs had exsanguinated within 24 hours, whereas 82% of norepinephrine-treated animals survived.

2880 THE EFFECT OF LYMPHOCYTES FROM SUFFERERS FROM RECURRENT APHTHOUS ULCERATION UPON CELLS IN TISSUE CULTURE. *(E.)* Dolby, A. E. (Welsh Natl. Sch. Med., Dental Sch., Cardiff, Wales). *Gut* 13(5):387-389, 1972.

The release of ^{51}Cr from labeled colon cells was used to assess a possible lymphocytotoxic effect of peripheral blood lymphocytes from patients (4 female, 2 male; aged 22-56 yr) with recurrent aphthous ulceration. No significant difference was found between the isotope release following addition of lymphocytes from aphthal patients or control lymphocytes. The absence of such a lymphocytotoxic effect, detectable with oral epithelial cells, suggests that colonic and oral target cells are not sufficiently similar for antigenic recognition to occur. However, it does not rule out the possibility of oral epithelial attack in ulcerative colitis, a phenomenon which may underlie oral ulceration which sometimes accompanies ulcerative colitis.

2881 HYPERPARATHYRODISM IN THE ZOLLINGER-ELLISON SYNDROME: INFLUENCE OF HYPERCALCEMIA ON CLINICAL COURSE.

(E.) Turbey, W. J.; Passaro, Jr., E. (Wadsworth VA Hosp., Los Angeles, Calif.). *Arch. Surg.* 105(1):62-66, 1972.

The frequent association of parathyroid hyperplasia or adenoma with Zollinger-Ellison syndrome suggests a relation between the serum calcium level, serum gastrin level, and gastric acid production. Patients (4 men, aged 33-48 yr) with elevated serum gastrin levels had elevated serum calcium levels. Each patient had hypercalcemia which was secondary either to a single parathyroid adenoma (2 cases) or primary chief-cell hyperplasia involving several glands (2 cases). All underwent parathyroidectomy. Three patients showed marked clinical improvement and decreased basal acid secretion after calcium levels returned to normal. A prompt decline occurred in serum gastrin levels in 2 patients after excision of parathyroid adenomas or hyperplastic glands. The 4th patient had a previous total gastrectomy and persistently elevated serum gastrin levels. He developed hypercalcemia years later.

2882 VISUALIZATION BY IMMUNE ELECTRON MICROSCOPY OF A 27-nm PARTICLE ASSOCIATED WITH ACUTE INFECTIOUS NONBACTERIAL GASTROENTERITIS.

(E.) Kapikian, A. Z.; Wyatt, R. G.; Dolin, R.; Thornhill, T. S.; Kalica, A. R.; Chanock, R. M. (Lab. Infectious Dis., Natl. Inst. Health, Bethesda, Md.). *J. Virol.* 10(5):1075-1081, 1972.

A 27-nm particle, morphologically resembling the paroviruses and picornaviruses, was observed by immune electron microscopy in an infectious stool filtrate derived from an outbreak of acute infectious nonbacterial gastroenteritis in Norwalk, Ohio. Inactivated convalescent serum from experimentally infected volunteers was used as a source of specific antibody. Both experimentally and naturally infected individuals developed serological evidence of infection. This suggests that the particle is the etiological agent of Norwalk gastroenteritis. This is the first description of an etiological agent of acute infectious nonbacterial gastroenteritis.

2883 CLINICAL EXPERIENCE WITH SELECTIVE INTRA-ARTERIAL INFUSION OF VASOPRESSIN IN THE CONTROL OF GASTROINTESTINAL BLEEDING FROM ARTERIAL SOURCES.

(E.) Nusbaum, M.; Baum, S.; Blakemore, W. S.; Tumen, H. (Graduate Hosp. Univ. Pennsylvania, Philadelphia). *Am. J. Surg.* 123(2): 165-172, 1972.

The source of bleeding in 8 patients with massive arterial gastrointestinal hemorrhage was demonstrated by selective mesenteric arteriography. The patients had the following disorders: hepatic and renal failure, extensive pancreatitis, and stomach ulcer (1); hemorrhagic gastritis (2); stress ulcer of the colon (1); acute alcohol intoxication resulting in a Mallory-Weiss tear in the cardioesophageal area (2); systemic scleroderma and an arteriovenous malformation in the terminal ileum (1); active bleeding lesion in the cecum and vascular ectasia in the cecum and ascending colon (1). Subselective intra-arterial infusion of vasopressin (0.1-0.2 pressor U/ml/min) completely controlled their bleeding. Of these 8 patients, 7 left the hospital without requiring surgery. The 8th underwent right colectomy while still in the hospital in order to correct the vascular ectasia of the cecum.

2884 STARCH GRANULOMATOUS PERITONITIS.

(E.) Holmes, E. C.; Eggleston, J. C. (Johns Hopkins Hosp., Baltimore, Md.). *Surgery* 71(1): 85-90, 1972.

Laparotomy had been performed on 13 patients, 10-30 days prior to the onset of symptoms of starch granulomatous peritonitis. None of the operations were for intra-abdominal sepsis or perforated viscus. The gross findings at re-operation were: a thickened nodular omentum (11 of 13 patients); ascitic fluid (9); small miliary nodules scattered over the serosal surfaces (9); and dense adhesions (9). In all but 2 cases, discrete well-formed granulomas with epithelioid cells and giant cells, containing starch particles were present. Two patients with recurrent abdominal complaints during the postoperative period were treated with steroids and improved significantly. Only 1 patient required a second exploratory operation, 15 yr after surgery for starch peritonitis. The rapidity with which gross surgical findings develop suggests the diagnosis of starch peritonitis rather than carcinoma or peritoneal tuberculosis, both of which are similar in appearance. The appearance of the characteristic maltese cross birefringenee on polarized light examination of the affected tissues is a diagnostic aid.

2885 THE PATHOGENESIS OF SHIGELLA DIARRHEA. II. ENTEROTOXIN-INDUCED ACUTE ENTERITIS IN THE RABBIT ILEUM.

(E.) Keusch, G. T.; Grady, G. F.; Takeuchi, A.; Sprinz, H. (Biol. Lab., State Lab. Inst., Massachusetts Dept. Public Health, Boston). *J. Infect. Dis.* 126(1):92-95, 1972.

Shigella dysenteriae 1 enterotoxin inoculated into 105 ligated ileal loops of 23 rabbits produced alterations and extrusion of villous epithelial cells as early as 1 hr after challenge. Epithelial cells were cuboidal rather than columar after 6 hr; the villi were shortened with a decreased villus-to-crypt ratio and with many intact or degenerating transmigrating lymphocytes. Neither *Vibrio cholerae* enterotoxin nor heat-inactivated Shigella toxin caused detectable alterations in the mucosal architecture. Therefore, *S. dysenteriae* 1 enterotoxin is cytotoxic to the intestinal epithelial cell *in vivo*. The changes induced are similar to those previously found after p.o. challenge of guinea pigs with live, virulent *Shigella flexneri 2a*. Some of the virulence of *Shigella* species in the gastrointestinal tract may be mediated by cell-free toxins. These results distinguish the mode of action of *Shigella* enterotoxin from that of cholera enterotoxin.

2886 LYMPHATIC DRAINAGE PATTERNS AND EXPERIMENTAL FILARIASIS IN DOGS. *(E.)* Schacher, J. F.; Sulahian, A. (Div. Infect. Trop. Dis., Univ. California, Los Angeles). *Ann. Trop. Med. Parasitol.* 66(2):209-217, 1972.

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2889 MESENTERIC ARTERIAL DISEASE. *(E.)* Perdue, Jr., G. D.; Smith, III, R. B.; Dempsey, R. L. (Emory Univ. Sch. Med., Atlanta, Ga.). *Am. J. Gastroenterol.* 58(4):428-434, 1972.

2890 GASTROINTESTINAL COMPLICATIONS IN NEUROSURGICAL PATIENTS TREATED WITH STEROIDS. *(E.)* Valergakis, F. E. G.; Critides, S.; Winokur, G. L. (Jersey City Med. Ctr., N.J.). *Am. J. Gastroenterol.* 58(4):441-446, 1972.

2891 AMYLOID IN THE GASTROINTESTINAL TRACT OF MICE. *(E.)* Ridgon, R. H.; Schadewald, T. (Univ. Texas Med. Br., Galveston). *Tex. Rep. Biol. Med.* 30(1):83-95, 1972.

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2893 CHEMOTHERAPY OF GASTROINTESTINAL CANCER. *(E.)* Krakoff, I. H. (Sloan-Kettering Inst., New York). *Cancer* 30(6):1600-1603, 1972.

2894 CAN GASTROINTESTINAL BLEEDING PROVOKE ERYTHROCYTE AUTOANTIBODIES? *(E.)* Jerne, D.; Sorvin, G.; Hansen, J. K. (State Serum Inst., Copenhagen, Denmark). *Lancet* 1(7794):79-80, 1973.

2895 THE VALUES OF SOME IMPORTANT BLOOD CONSTITUENTS, PARTICULARLY SERUM ELECTROLYTES, IN DEHYDRATED CHILDREN DUE TO GASTROENTERITIS. *(E.)* Darmawan, S.; Muliadi, W.; Mboi, N.; Trenggonowati, R. (Med. Sch., Univ. Indonesia, Jakarta). *Paediatr. Indones.* 12(2):68-72, 1972.

2896 GASTROENTEROLOGICAL DISEASE IN SWITZERLAND. DATA ON MORBIDITY AND MORTALITY. *(Ger.)* Sautter, V.; Bircher, J. (Inst. Clin. Pharmacol., Univ. Bern, Switzerland). *Schweiz. Med. Wochenschr.* 102(21):738-747, 1972.

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2904 ORAL BOVINE SERUM FOR GASTROINTESTINAL ATONIA. *(Ger.)* Fodor, L. (Detmold Regional Hosp., Germany). *Munchen. Med. Wochenschr.* 114(7):292-293, 1972.

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2910 USE OF DRAINAGE FOR DIFFUSE SUPPURATIVE PERITONITIS. *(Pol.)* Czerucki, W. (Hedi Chaker Hosp., Sfax, Tunisia). *Pol. Przegl. Chir.* 44(7):1255-1259, 1972.

2911 CHOLESTEROL DEPOSITIS IN THE BILIARY TRACT. *(Sp.)* Agusti Peypoch, J. A. (Nuestra Senora del Sagrado Hosp., Corazon, Spain). *An. Med. (Barc.).* 58(1):37-41, 1972.

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2927 GRANULOMATOUS PERITONITIS CAUSED BY STARCH GLOVE POWDER. *(E.)* Coder, D. M.; Olander, G. A. (Abraham Lincoln Sch. Med., Univ. Illinois, Chicago). *Arch. Surg.* 105(1):83-86, 1972.

2928 STUDY OF THE SELECTIVITY, TOLERANCE, AND THERAPEUTIC STATUS OF ANISOTROPINE METHYLBROMIDE AND ITS COMBINATIONS (VAPIN COMPLEX) IN GASTROINTESTINAL DISEASE AND SPASTIC DISORDERS OF THE BILIARY TRACT. *(Sp.)* Cabeza Madurell, J. (Fac. Med., Barcelona, Spain). *Folia Clin. Int. (Barc.)* 22(6):438-435, 1972.

2929 MOTION SICKNESS AND TRAVELLERS DIARRHOEA. *(E.)* Turner, A. C. (no affil.). *Roy. Soc. Health J.* 92(3):146-150, 1972.

2930 IMMUNOGLOBULIN LEVELS IN PREMATURE NEWBORNS WITH GASTROENTERITIS. *(Gr.)* Skardoutsou, A.; Alexiou, D.; Kourea-Kremastinou, T.; Papaevangelou, G.; Papadatos, K. (Clin. Obstet. Gynecol., Univ. Athens, Greece). *Acta Microbiol. Hellenica* 17(2):81-93, 1972.

2931 NATURAL HISTORY OF PATIENTS WITH X-RAY-NEGATIVE DYSPEPSIA IN GENERAL PRACTICE. *(E.)* Gregory, D. W.; Daview, G. T.; Evans, K. T.; Rhodes, J. (Welsh Natl. Sch. Med., Cardiff, Wales). *Br. Med. J.* 4(5839):519-520, 1972.

2932 BACTERIAL DIARRHOEAL DISEASES IN SUDANESE CHILDREN. *(E.)* Erwa, H. H.; Yousif, M.; Gumaa, S. A. (Univ. Khartoum, Sudan). *J. Trop. Med. Hyg.* 74(8):177-181, 1971.

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2934 INDIRECT HAEMAGGLUTINATION TESTS IN ASSESSING THE AETIOLOGIC ROLE OF CERTAIN SUSPECT ENTEROBACTERIA IN DIARRHOEAL DISEASES OF PRE-SCHOOL CHILDREN. *(E.)* Bhat, P.; Myers, R. M.; Jadhav, M. (Christian Med. Coll., Vellore, India). *Indian J. Med. Res.* 59(4):515-525, 1971.

2935 NONCASEATING TUBERCULOUS PERITONITIS. *(E.)* Fedotin, M.; Brewer, D. (Duke Univ. Hosp., Durham, N.C.). *Arch. Intern. Med.* 130(6):920-922, 1972.

2936 HORIZONS IN GASTROINTESTINAL RESEARCH. *(E.)* Silen, W. (Beth Israel Hosp., Boston, Mass.). *Surgery* 72(1):91-93, 1972.

2937 STUDIES IN ANCYLOSTOMA CANINUM INFECTION IN DOGS. II. ANATOMICAL CHANGES IN THE GASTROINTESTINAL TRACT. *(E.)* Migasena, S.; Gilles, H. M.; Maegraith, B. G. (Fac. Trop. Med., Mahidol Univ., Bangkok, Thailand). *Ann. Trop. Med. Parasitol.* 66(2):203-207, 1972.

2938 FUNCTIONAL VOMITING. *(E.)* Hill, O. W. (Middlesex Hosp. Med. Sch., London, England). *Br. J. Hosp. Med.* 7(6):755-766, 1972.

See also 2013, 2049, 2232, 2247, 2255, 2258, 2265, 2273, 2275, 2284, 2290, 2293, 2295, 2299, 2304, 2321, 2397, 2440, 2451, 2582, 2599, 2641, 2647, 2656, 2670, 2679, 2750, 2984.

Parasitology

GENERAL

2939 AMOEBIC PERITONITIS: A STUDY OF 73 CASES. *(E.)* Kapoor, O. P.; Nathwani, B. N.; Joshi, V. R. (Grand Med. Coll., Bombay, India). *J. Trop. Med. Hyg.* 75(1):11-15, 1972.

Amebic peritonitis, studied in 73 cases (66 male, 7 female, aged 25-70 yr), is often due to spread of amebic infection from the submucosa to the peritoneum. Cases of uncomplicated amebic dysentery (100) were also studied. In our cases there was nothing to suggest fulminating amebic dysentery. At autopsy 54 of the patients had generalized peritonitis; in 17 cases this was due to manifest colon perforation, and in 27 to rupture of a liver abscess. Of these 54 cases, 9 involved only the colon; 45 involved both colon and liver. There were 2 cases of localized peritonitis found at autopsy. In peritonitis with marked distension, an amebic etiology was suggested by presence of dysentery (as occurred in 48% of these cases), jaundice (26%), hepatomegaly (51%), edema (29%), and altered mental state (34%). Screening of chest and proctoscopy help to make the diagnosis.

2940 NEW AMOEBICIDE (MK-910) IN TREATMENT OF HEAPTIC AMOEBIASIS. *(E.)* Batra, S. K.; Rellan, D. R.; Ajmani, N. K.; Chuttani, H. K. (Maulana Azad Med. Coll., New Delhi, India). *J. Trop. Med. Hyg.* 75(1):16-18, 1972.

The efficacy of a new amebicide, 1-methyl-2-(4'-fluorophenyl)-5-nitroimidazole (MK-910), was evaluated in 43 patients (36 male and 7 female, aged 14-73 yr) suffering from amebic abscess of the liver. MK-910 was administered p.o. in doses of 0.5-3 mg/kg in 3 divided doses for 10 days. Fever subsided within 2 to 6 days in all groups, tenderness in 4 to 10 days, and fluid aspirated from the days in 40 patients. No statistical difference was observed between responses to the different dosage schedules. There were no abnormalities in liver function tests, blood sugar, urea, or serum electrolytes. Nausea, giddiness and vomiting were the only side effects noted in 4 patients. Transient nonspecific electrocardiographic changes were observed in 1 patient on a dosage of 3 mg/kg.

2941 FLAGYL (METRONIDAZOLE) IN THE TREATMENT OF INTESTINAL AMEBIASIS. (PART 3). *(E.)* Tjaij, J. K.; Raid, N.; Sutanto, A. H. (Med. Sch., Univ. North Sumatra, Medan, Indonesia). *Paediatr. Indones.* 12(2):82-86, 1972.

Among children treated in an outpatient clinic in Northern Sumatra, the prevalence of acute intestinal amebiasis was 25.3% for those aged 1-3 yr, 50.2% for those aged 3-6 yr, 18.5% for those aged 6-9 yr, and 6% for those aged 9-12 yr. Administration of metronidazole (25 or 50 mg/kg/day) for 3 days to 162 children caused rapid improvement of symptoms, decreased the frequency of stools, and changed their consistency from liquid to solid. Microscopic examination of the stools, made 2 weeks after administration of metronidazole, showed cure rates of 91-100%. No significant differences were found in the cure rates of children given 25 mg/kg/day and those given 50 mg/kg/day. At present metronidazole in considered the drug of choice for treating intestinal amebiasis.

2942 EVALUATION OF EXOCRINE PANCREAS FUNCTION IN THE HEPATOSPLENIC FORM OF SCHISTOSOMA MANSONI INFESTATIONS IN MAN. *(Por.)* Mott, C. B.; Neves, D. P.; Bettarello, A. (Fac. Med., Univ. Sao Paulo, Brazil). *Arq. Gastroenterol.* 9(2):41-46, 1972.

2943 PROS AND CONS FOR IMMUNOLOGICAL DIAGNOSIS OF INTESTINAL PARASITES. *(Sp.)* de la Plaza, N. A. (5th Sanit, Region, Buenos Aires Province, Argentina). *Rev. Asoc. Bioquim. Argent.* 37(199/200):16-26, 1972.

2944 THE FINDING OF TROPHOZOITES FROM ENTAMOEBA HISTOLYTICA IN THE CONTENTS OF A LIVER ABSCESS. *(Sp.)* Apt, W.; Difilippi, C.; Subiabre, V. (Dept. Microbiol. Parasitol., Univ. Chile, Santiago). *Bol. Chil. Parasitol.* 27:55-56, 1972.

2945 INTESTINAL PARASITISM IN MALAYAN ABORIGINES (ORANG ASLI). *(E.)* Dunn, F. L. (Dept. Int. Health, Univ. California, San Francisco). *Bull. W.H.O.* 46(1):99-113, 1972.

2946 FREQUENCY OF INTESTINAL PARASITES INFESTATION AND INFECTION IN INFANTS AND CHILDREN IN PADANG AREA, WEST SUMATRA. (PRELIMINARY REPORT. *(E.)* Daili, S.; Jahja, E.; Sjoeib, A. A.; Martono; Martono (Central Gen. Hosp., Padang, Indonesia). *Paediatr. Indones.* 12(2):87-91, 1972.

2947 HUMAN INTESTINAL NEMATODIASIS IN THE UNITED STATES. *(E.)* Barrett-Connor, E. (Dept. Community Med., Univ. California, San Diego). *Calif. Med.* 117(1):8-13, 1972.

2948 DIARRHOEA IN SCHOOL-AGE SOUTH INDIAN CHILDREN. 1. PRELIMINARY OBSERVATIONS ON CLINICAL FEATURES AND AETIOLOGY. 2. RESULTS OF A THERAPEUTIC TRIAL WITH RIVANOL-LACTATE AND CHLOROSTREP. RESULTS OF A THERAPEUTIC TRIAL WITH RIVANOL-LACTATE AND CHLOROSTREP. *(E.)* Jadhav, M.; Gopalakrishnamurthy, H. R.; Koshi, G. (Christian Med. Coll., Vellore, India). *Indian Pediatr.* 9(4):190-196, 1972.

2949 AMEBIC LIVER ABSCESS. *(Sp.)* Balcells, A.; Segura, F.; Costa, J.; Milla, J. (Fac. Med., Barcelona, Spain). *An. Med. (Barc.)* 58(1):15-21, 1971.

2950 PERICARDIAL AMOEBIASIS FOLLOWING AMOEBIC LIVER ABSCESS OF THE LEFT LOBE. *(E.)* Kapoor, O. P.; Shah, N. A. (J. J. Group of Hospitals, Bombay). *J. Trop. Med. Hyg.* 75(1):7-10, 1972.

2951 THE LIVER IN GIARDIASIS. *(Pol.)* Batko, B. (Hosp., Gliwice, Poland). *Pol. Tyg. Lek.* 27(32):1241-1242, 1972.

2952 CLINICAL TRIAL OF ETOFAMIDE IN THE TREATMENT OF CHRONIC INTESTINAL AMEBIASIS. (STUDY WITH A NEW THERAPEUTIC SYSTEM). *(Por.)* Huggins, D. (no affil.). *An. Esc. Nacl. Sauda Publica Med. Trop. (Lisb.)* 5(3/4):267-269, 1971.

2953 SUSPECTED LEPTOSPIROSIS IN GOATS. *(E.)* Khanna, R. S.; Iyer, P. K. R. (Postgrad. Coll. Anim. Sci., Izatnagar). *Indian J. Med. Res.* 59(10):1588-1590, 1971.

2954 HEMORRHAGIC DIATHESIS IN LEPTOSPIROSIS AND THE PATHOGENESIS OF SEVERE FORMS. *(Rum.)* Prodrom, I. (Hosp. No. 3, Galati, Rumania). *Microbiol. Parazitol. Epidemiol. (Bucur.)* 27(2):97-110, 1972.

2955 SOME NOTES ON A CASE OF ASCARIASIS AND TRICHURIASIS WITH PLEURAL AND PULMONARY STAPHYLOCOCCUS INFECTION. *(Rum.)* Bulucea, D.; Rarinca, A. (1st Pediatr. Clin., Cluj, Rumania). *Microbiol. Parazitol. Epidemiol. (Bucur.)* 27(2):169-174, 1972.

2956 AMOEBIC APPENDICITIS. *(E.)* Kapoor, O. P.; Joshi, V. R.; Sabnis, A. M. (Grant Med. Coll. Bombay, India). *J. Trop. Med. Hyg.* 75(1):1-3, 1972.

2957 CLINICAL AND LABORATORY ASPECTS OF HOOKWORM INFECTION AND ANAEMIA. *(E.)* Gilles, H. M. (Liverpool Sch. Trop. Med., England). *Acta Gastroenterol. Belg.* 35(6):267-276, 1972.

2958 ROLE OF GASTRO-INTESTINAL PARASITES IN URTICARIA. *(E.)* Pasricha, J. S.; Pasricha, A.; Prakash, O. M. (All-India Inst. Med. Sci., New Delhi). *Ann. Allergy* 30(6):348-351, 1972.

2959 FEATURES OF ASCARIASIS OF THE BILIARY TRACT IN CHILDREN. *(Bul.)* Milkov, G. (Vietnam-Bulgarian Friendship Hosp., Taibin, Vietnam). *Khirurgiia (Sofiia).* 25(3):300-304, 1972.

2960 ORGANIZING THE WORK OF MEDICAL PERSONNEL FOR THE DIAGNOSIS OF PATIENTS WITH TAENIARHYNCHUS INFESTATIONS. *(Rus.)* Kolonitskii, A. T. (no affil.). *Zdravookhran. Tadzh.* 19(4):52-55, 1972.

2961 GASTROINTESTINAL PARASITE INFESTATION AND LACTASE DEFICIENCY IN CHILDREN. *(Rum.)* Grigorescu-Sido, P.; David, C.; Lazar-Garoiu, F. (1st Pediatr. Clin., Cluj, Rumania). *Pediatria (Bucharest)* 21(2):115-124, 1972.

2962 HOOKWORM INFESTATION IN IMMIGRANT WORKERS FROM BRAZIL. *(Ger.)* Schon, K.; Beckenkamp, H. W. (Inst. Hyg. Infect. Dis., Saarbrucken, Germany). *Med. Klin.* 67(15):540-544, 1972.

2963 TREATMENT OF AMEBIC DYSENTERY WITH METRONIDAZOLE. *(Kor.)* Kim, H. B.; Choi, H. J. (Inchon Christian Hosp., Korea). *Korean J. Intern. Med.* 15(2):109-111, 1972.

See also 2772, 2826, 2868, 2937.

NUMBERS FOLLOWED BY AN ASTERISK INDICATE ABSTRACTS. OTHER NUMBERS REFER TO CITATIONS.

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AAGAARD, P. 2094, 2491, 2497
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ADAMS, W.A. 2505*
ADHOUTE, B. 2516
ADSON, M.A. 2681
AGARWAL, R.N. 2467
AGARWAL, V.P. 2821*
AGUSTI PEYPOCH, J.A. 2911
AGZAMKHODZHAEV, S.M. 2600
AHO, A.J. 2858
AIZMAN, R.I. 1994
AJMANI, N.K. 2940*
AKIN, A.N. 2048*
AKIYAMA, N. 2138
AL-AWQATI, Q. 2020*
AL-KHALIDI, U.A.S. 2277
ALADZHOVA, D. 2389
ALBERTI, K.G.M.M. 2771
ALBUKERK, J. 2770
ALEMANY ONTIVEROS, J.R. 2420
ALEXIOU, D. 2930
ALFIDI, R.J. 2504*
ALFIERI, O. 2026, 2329, 2344*
ALIOTTA, P. 2069, 2070
ALLAN, J.G. 2585*
ALLAN, R.N. 2253
ALLEN, J.R. 2353
ALPERT, L.I. 2608*
AMDRUP, E. 2407*, 2409*, 2414*, 2445
AMIR-JAHED, A.K. 2826*
AMIRKHAN, A. 2341
AMMANN, R. 2250
AMURE, B.O. 2117*
ANACKER, H. 2279
ANDERSON, C.M. 2699
ANDERSON, D.C. 2822*
ANDERSON, M.C. 2515, 2711
ANDERSSON, A. 2865
ANDREASSEN, J. 2414*
ANDREASSEN, M. 2094
ANDREEVA, N.I. 2106
ANGHELESCU, V. 2701
ANGULO, M. 2100
ANISZCZENKO, J. 2659
ANSANELLI, V. 2916
ANTON, H.C. 2257
AOKI, N. 2636
APARISI QUEREDA, L. 2595
APT, W. 2944
ARAPOVA, A.D. 2490
ARBUCKLE, J.B.R. 1989
ARCARI, F. 2540
ARCHAMPONG, E.Q. 2750
ARCHIBALD, R.W.R. 2226
ARGIANAS, S. 2332
ARGUTINSKAYA, S.V. 2099
ARMSTRONG, S.J. 2187
ARNESJO, B. 2133*
ARNOLD, J. 2363
ARRIBAS, J.M. 2364
ARTIGAS, V. 2457
ASCH, M.J. 2624
ASQUITH, P. 2587*
ASSMUS, B. 2380
ASSODI, A. 2559
ATZENHOFER-BAUMGARTNER, K. 2599
AUBREY, D.A. 2077*
AUNE, S. 2439, 2440, 2461
AVERY, M.D. 2167
AYABE, M. 2354
AYANDIPO, A. 2117*
AYOOLA, E.A. 2902
AYULO, J.A. 2489
AZAR, H. 2826*
AZNAR LOPEZ, J. 2420
BABA, S. 2390
BABAEVA, A.G. 2215
BACK, O. 1998, 1999
BADDER, E.M. 2866
BADOLATI, G. 2294
BAHADUR, V. 2179
BAILLET, J. 2433
BAKALOUDIS, P.T. 2424
BAKER, J.Q. 2867
BAKHSHANDEH, K. 2557
BAKRAN, I. 2573
BALART, L. 2316
BALASEGARAM, M. 2747, 2764

BALASUBRAMANIAM, S.
2466
BALCELLS, A.
2949
BALDE, I.
2748
BALDWIN, R.W.
1992
BALFOUR, T.W.
2672
BALISH, E.
2506*
BALLANTYNE, B.
2224
BALOGH, I.
2436
BALTZER, G.
2123
BANDLER, M.
2646
BANK, S.
2590
BANKE, L.
2274
BANKE, O.
2783*
BANWELL, J.G.
2204*
BARBORIAK, J.J.
2478, 2479
BARBULESCU, E.
2918
BARCLAY, T.H.C.
2605*
BARKER, L.F.
2732*
BARMAN, A.A.
2336
BARRESI, G.
1993
BARRETT-CONNOR, E.
2947
BARRIER, J.P.
2655
BARRNETT, R.J.
1980*
BARTER, P.J.
2818
BASSO, N.
2287, 2464
BASTIS-MAOUNIS, B.
2852*
BATIUCHOK, W.
2336
BATKO, B.
2951
BATRA, S.K.
2940*
BATSAKIS, J.G.
2912
BATSON, R.C.
2416*
BATTISTONE, G.C.
2828*
BATTLE, W.S.
2313*, 2325
BAUERLE, H.
2262
BAUM, S.
2397, 2883*
BAUME, P.
2614
BEAHRS, O.H.
2663
BEALES, J.S.M.
2231*
BEALL, A.C., JR.
2623
BECK, I.T.
2322
BECKENKAMP, H.W.
2962
BECKWITH, J.B.
2534
BEECKMAN, P.
2285
BEERMANN, B.
2006*
BEESLEY, W.H.
2118*
BEGER, H.G.
2237
BEKASSY, S.M.
2315*
BELFASKY, R.B.
2879*
BELL, G.D.
2254, 2850*
BELL, P.R.F.
2164
BELLOMO, J.A.
2835
BELSKA, Z.
2483
BENES, F.M.
1980*
BENFIELD, J.R.
2507*
BENGMARK, S.
2844
BENHAMOU, J.P.
1979*
BENNETT, A.J.E.
2787
BENO, I.
2431
BERDON, J.K.
2809
BERG, N.O.
2824*
BERGDAHL, L.
2865
BERGMARK, J.
2071*
BERK, J.E.
2272
BERLE, E.
2665
BERNARDIS, L.L.
2188
BERNATZ, P.E.
2669
BERNDT, W.
2245
BERNSTEIN, L.H.
2404
BERRY, C.L.
2223
BERRY, C.S.
2129*
BERSIMBAEV, R.I.
2099
BERSON, S.A.
2084*
BESSMAN, S.P.
2177
BESWICK, F.W.
2224
BETTARELLO, A.
2538, 2693, 2942
BHAGWAT, A.W.
2429
BHALERAO, R.A.
2738
BHANA, D.
2098
BHAT, P.
2933, 2934
BHORASKAR, S.N.
2831
BIEBERDORF, F.A.
2509*
BIERNAT, J.
2913
BILL, A.H.
2534
BILLICH, C.
2421
BINDEL, E.
2340
BINSWANGER, U.
2032
BIRCHER, J.
2896
BIRD, R.G.
2187
BITTER-SUERMANN, H.
2171
BJARK, P.
2807
BLACK, O.
2113*, 2115*
BLACKMAN, A.
2289
BLACKSHEAR, P.L.
2438
BLAKEMORE, W.S.
2883*
BLAUARMEL, O.
2249
BLUMGART, L.H.
2231*
BOBERG, F.
2838
BOCK, K.W.
2139, 2151
BODE, C.
2123, 2825*
BOEV, K.K.
2057
BOGDANOWSKI, T.
2666
BOLLUM, F.J.
2189

BOLTON, B.H.
2828*
BOMBECK, C.T.
2313*, 2325
BONANDRINI, L.
2564
BONANNO, C.A.
2776*
BONFILS, S.
2111*
BONIFAS, V.
2299
BONNIN, A.
2236
BONTA, I.L.
2062, 2063
BOOKALLIL, M.J.
2154
BOQUIST, L.
2865
BORIRAKCHANYAVAT, V.
2768*
BORISIUK, I.I.
2871
BORNER, J.W.
2438
BORRESEN, H.C.
2314*
BOTROS, B.A.M.
2772
BOUCHIER, I.A.D.
2136
BOURGEON, A.
2435
BOWN, R.L.
2822*
BOYER, R.
2435
BRAASCH, J.W.
2853*
BRACELAND, B.M.
2150
BRACHTEL, H.
2774
BRACKERTZ, D.
2806
BRADLEY, B.R.
2226
BRAGHERI, R.
2860
BRAILLARD, C.
2558
BRANDALISE, N.A.
2502
BRANDT, E.N., JR.
2157
BRANDT, K.H.
2844
BRAS, G.
2605*
BREINING, H.
2126*, 2925
BRENNAN, L.P.
2624
BRENNEMAN, D.E.
2846*
BREWER, D.
2935
BRICHOVA, H.
2000
BRICKER, D.L.
2623
BRIEBSCH, G.
2691
BRIXOVA, E.
2840
BROIDO, P.W.
2075*
BROOKS, F.P.
2091*
BROOKS, J.R.
2695
BROOKS, S.G.
1977*, 1978*
BROSS, T.
2554
BROWN, B.L.
2751
BROWN, H.
2145
BROWN, J.
2014*
BROWN, J.C.
2080*
BRUCE, J.
2678*
BRUNO, M.S.
2370
BRYAN, J.A.
2775*, 2785
BRZOSKO, W.J.
2779*
BUCHOWICZ, J.
2163
BUCHWALD, H.
2025*
BUCKO, A.
2119, 2431
BUCLON, M.
2034
BUDILLON, G.
2788
BUGNION, M.
2363
BULAN, M.B.
2680
BULUCEA, D.
2955
BUNNELL, C.E.
2726
BURGESS, P.
2166
BURKE, C.W.
2822*
BURKHART, K.L.
2324
BURKITT, D.P.
2604*
BURNS, G.P.
2077*
BURNS, T.D.
2413*
BURNS, W.
2820
BURRELL, C.J.
2282
BURRINGTON, J.D.
2521
BURWOOD, R.
2231*
BUSTOS, G.O.
2160
BUTCHER, R.E.
2124*
BUXTON, B.
2087*
BUXTON, B.F.
2164
BYNUM, T.E.
2494
BYRNE, J.J.
2214
CABEZA MADURELL, J.
2928
CABEZAS, J.A.
1982
CACERES, A.
2922
CADEMARTIRI, G.
2026, 2344*
CADY, B.
2606*
CALMAN, K.C.
2164
CALMAT, A.
2713
CALNE, R.Y.
2171
CAMPBELL, C.B.
2166, 2268
CAMPION, E.C.
2744
CAMPS VILATA, B.
2595
CANTARELLI, I.
2472
CANTERBURY, J.M.
2086*
CAPOFERRO, R.
2400, 2401, 2405
CARAYON, P.
2655
CARD, W.I.
2678*
CARDI, E.
2737
CAREY, M.C.
2739
CARLBORG, L.
2463
CARLSSON, A.
2071*
CARNEVALE, N.J.
2622
CARNEVALI, L.
2248
CARNOT, F.
2391, 2655
CAROLI, J.
2742
CARR, H.E.
2785
CARR, J.
2613

CARRASCO SALAS, J.M.
2420
CARRELLA, M.
2788
CARROLL, K.F.
2818
CARROZZA, G.
1993
CARTER, D.C.
2098
CARTER, E.A.
2342
CASSIMOS, C.
2923
CASTAGNETTA, L.
2007*
CASTELFRANCHI, P.L.
2284
CASTRO, L.A.P.
2502
CASTRO, M.
2737
CAVALLERO, C.
2248
CEBRELLI, C.
2564
CENEVIVA, R.
2284
CEULEMANS, G.
2660
CHACKO, M.V.
2745
CHAKRABARTY, A.
2179
CHAN, C.
2820
CHANCO, A.G., JR.
2632
CHANDLER, J.G.
2170
CHANDRA, D.
2429
CHANG, L.M.S.
2189
CHANOCK, R.M.
2882*
CHAPMAN, M.L.
2406*
CHAPPELL, J.S.
2534
CHARAN, A.
2372
CHARLIONET, R.
2834
CHAUDHARY, V.K.
2821*
CHAVY, A.
2233*, 2722
CHEARANAI, O.
2752
CHEN, C.H.
2743
CHEN, M.F.
2743
CHEN, W.L.
2183
CHERUBIN, C.E.
2777*
CHESNEY, T.M.
2708*
CHEVALLIER, F.
2073
CHHUTTANI, P.N.
2428
CHISHOLM, D.P.
2867
CHISTIAKOVA, N.S.
2490
CHOI, H.J.
2963
CHOI, L.
2100
CHOLEVAS, M.
2712
CHORVATHOVA, V.
2431
CHOU, C.C.
2413*
CHRISTENSEN, J.
2047*, 2049*, 2050*, 2054*
CHRISTIANSEN, J.
2491, 2497
CHRISTOFOROV, B.
2306
CHRISTY, J.P.
2618
CHRYSOSPATHIS, P.
2332
CHU, S.H.
2743
CHURG, A.
2121
CHUTTANI, H.K.
2940*
CHWIALKOWSKI, J.
2692
CIGHIR, R.
2701
CLARK, L.M.
2679*
CLARK, M.L.
2822*
CLARK, R.
2768*
CLASSEN, M.
2262, 2925
CLEMENTE, F.
2112*
CLEMMEMSEM, T.
2639
CLERMONT, H.G.
2168
CLEVELAND, B.R.
2529
CLEVELAND, R.J.
2735
CLOSS, O.
2807
CLOT, J.P.
2218
COCHETON, J.J.
2306
CODE, C.F.
2041*
CODER, D.M.
2927
COHEN, S.
2051*, 2327
COHN, J.
2795
COHN, J.N.
2811*, 2815
COHRS, G.W.
2906
COLE, F.N.
2342
COLLINS, K.
2763
COLTORTI, M.
2788
COMBE, J.
2651
COMTE, B.
2394
CONDON, R.E.
2075*, 2211*
CONE, L.A.
2777*
CONKLIN, E.F.
2776*
CONNELL, H.C.
2899
CONNER, W.E.
2846*
CONNOLLY, J.E.
2410*
CONQUEST, H.F.
2615
CONTE, V.P.
2857
COOK, J.S.
2782*
COOKE, A.R.
2043*
COOKE, W.T.
2587*
COOPER, P.H.
2357
COOPERMAN, A.M.
2669, 2681
COPPLER, M.
2763
CORDON, M.
2922
CORKER, C.S.
2822*
CORLETTE, M.B., JR.
2727
CORNELL, R.
2018*
CORNET, A.
2391, 2655
CORREA, W.G.
2480
CORT, C.R.
2647
COSTA, F.
2724
COSTA, G.
2782*
COSTA, J.
2949
COTTON, P.B.
2231*

NUMBERS FOLLOWED BY AN ASTERISK INDICATE ABSTRACTS. OTHER NUMBERS REFER TO CITATIONS.

COUPLAND, G.A.E.
2444
COWEN, A.E.
2268
COX, A.G.
2430, 2465
COXE, J.W., III
2615
CRANE, R.K.
1973*
CRASSOUS, J.
1979*
CREECH, W.B.
2775*
CREMIN, B.J.
2288
CREUTZFELDT, W.
2909
CRITIDES, S.
2890
CSENDES, A.
2101, 2312*
CULHANE, P.O.
2787
CUMBERLAND, V.H.
2444
CUNNINGHAM, P.J.
2529
CYBULSKIJ, B.A.
2378
CYWES, S.
2288
CZEREDA, T.
2554
CZERUCKI, W.
2910
DA COSTA, L.R.
2322
DABNEY, J.M.
2413*
DACHA, U.
2427
DAFTARY, M.
2341
DAGRADI, A.E.
2323, 2474
DAHLGREN, S.
2463
DAILI, S.
2946
DAILLY, R.
2333
DAL MONTE, P.R.
2239
DALE, J.
2114*
DAM, H.
2855
DAMGAARD, S.E.
2161
DAMMERT, K.
2897
DANA, E.R.
2272
DANDEKAR, N.V.
2335
DANNENMEIER, H.D.
2421
DARAZ, S.
2766
DARLING, R.C.
2629
DARMAWAN, S.
2895
DAS, B.
2372
DAS, M.M.
2374
DATTA, P.
2118*
DATTA, S.B.
2634
DAVE, K.S.
2315*
DAVENPORT, H.W.
2103
DAVENPORT, L.M.
2018*
DAVID, C.
2961
DAVIDIAN, V.A., JR.
2664
DAVIDSON, A.R.
2768*
DAVIES, G.T.
2231*
DAVIES, T.
2016*, 2017*
DAVIEW, G.T.
2931
DAVIS, D.R.
2171
DAVIS, M.V.
2339
DAY, N.E.
2605*
DAYTON, S.
2851*
DE ALMEIDA, J.W.
2480
DE BENEDICTO, J.M.
2527
DE BRITO, T.
2857
DE CARO, A.
2112*
DE FLORA, S.
2294
DE GROOT, T.J.
2528
DE JONG, U.W.
2605*
DE LA PLAZA, N.A.
2943
DE PAULA, W.
2527
DE SILVA, D.P.K.M.
2793
DE ZALENSKI, C.
2127*
DEBAKEY, M.E.
2623
DEBESSE, B.
2391
DELAND, F.H.
2296
DELANY, H.M.
2622
DELMAS, A.
2219
DELMOTTE, J.S.
2836
DELORME, G.
2259
DELUCA, F.G.
2907
DEMEESTER, T.R.
2311*
DEMLING, L.
2262, 2925
DEMPSEY, R.L.
2889
DENARDO, G.L.
2226
DENBESTEN, L.
2411*, 2846*
DENNHARDT, R.
2022*
DENNIS, C.
2520
DENOIX, P.F.
2233*
DENT, D.M.
2749
DEODHAR, K.P.
2738
DESBAILLETS, L.
2837
DESHPANDE, V.R.
2068
DESMYTER, J.
2808
DEYHLE, P.
2092, 2097, 2250
DI TORO, R.
2916
DIAMANT, N.E.
2048*
DIAMANT, Y.Z.
2184
DIAMOND, M.T.
2728
DIARD, F.
2259
DIAZ, C.
2879*
DIBOS, P.
2234*
DICKSON, J.D.
2282
DICKSTEIN, S.S.
2568
DIEDERICHSEN, H.
2805
DIETSCHY, J.M.
2593
DIFILIPPI, C.
2944
DILHUIDY, J.M.
2394
DIMITRIU, S.
2800
DINTSMAN, M.
2559

DIOP, A.
2748
DISERENS, R.V.
2790
DIXON, G.
2272
DIXON, R.L.
2193
DOBBINS, W.O., III
1977*, 1978*
DODDS, W.J.
2052*
DOLBY, A.E.
2880*
DOLIN, R.
2882*
DOMINO, E.F.
2192
DOMOKOS, L.
2917
DONAHOE, P.K.
2330
DONALDSON, G.A.
2423, 2526
DONCEL SANTAMARTA, C.
2364
DONES, F.
2007*
DONFRANCESCO, A.
2737
DONOVAN, A.J.
2221
DORPH, S.
2519
DOSS, M.
2731*
DOUGLAS, A.P.
2201*
DOVGUSHA, V.V.
2056
DOWLING, R.H.
2038, 2166, 2850*
DREILING, D.A.
2149, 2514
DREWS, R.
2387, 2459
DREYFUSS, J.R.
2870
DRUEKE, T.
2008*
DRUKKER, A.
2586*
DRUMMOND, J.M.
2154
DRYSDALE, H.C.
2283
DUBOIS, A.
2066
DUBOIS, R.S.
2778*
DUBRA, C.C.
2644
DUCKLER, L.
2845*
DUDENHAUSEN, R.
2293
DUDLEY, F.J.
2780*
DUFFY, J.L.
2770
DUNN, D.C.
2171
DUNN, F.L.
2945
DURBIN, R.P.
2082*
DYBKJAER, E.
2783*
DYCK, W.P.
2110*
DYKES, J.R.W.
2452
DYKES, P.W.
2253
DZURIK, R.
2840
DZURIKOVA, V.
2840
EARLAM, R.J.
2061, 2501, 2503
EASLEY, G.W.
2542
EATON, H.
2376
EATON, S.B., JR.
2870
ECKARDT, V.
2323
EDMONDS, R.H.
2015*
EFRON, G.
2404
EGAN-MITCHELL, B.
2584*
EGGER, G.
2549
EGGLESTON, J.C.
2620, 2884*
EIDINGER, D.
2588*
EINARSSON, K.
2185
EISENBERG, M.M.
2118*
EISNER, M.
2662
EKELUND, P.
2730*
ELDJARN, L.
2314*
ELKINS, R.C.
2311*
ELLIOT, D.W.
2266, 2901
ELLIS, F.H., JR.
2335
ELLIS, H.
2465
EMPEY, D.W.
2645
ENDMANN, P.
2625
ENDRENYI, L.
2300
ENGEL, K.
2915
ENGELSING, B.
2384
ERIKSSON, S.
2824*
ERLIJ, D.
2135
ERWA, H.H.
2932
ESCHAR, J.
2652
ESLER, M.D.
2611*
ESPINER, H.J.
2872
ESTERLY, J.R.
2685*
ESTERLY, N.B.
2685*
ESTLER, C.J.
2131*
ESTRICH, D.L.
2877
ETALA, E.
2627
EULENSTEDT, C.
2142
EVANS, D.M.
2522
EVANS, G.W.
2708*
EVANS, J.C.
2899
EVANS, K.T.
2931
EZIMOKHAI, M.
2117*
FAGNIEZ, P.L.
2218
FAIRCHILD, D.G.
2772
FAITEL'BERG, R.O.
2033
FALCONER, C.W.A.
2678*
FALK, G.
2879*
FALLON, H.J.
1978*
FARMER, R.G.
2684
FARPOUR, A.
2826*
FARRAR, W.E.
2580*
FARROW, G.M.
2681
FASSKE, E.
2153
FEDOTIN, M.
2935
FEIGELSON, J.
2686*
FEIGL, W.
1987
FEINBERG, S.N.
2290
FELDMANN, G.
1979*

FENN, A.S.
2466
FERGUSON, A.
1990
FERGUSON, R.K.
2610*
FERGUSON, W.W.
2116*
FERNANDES PONTES, J.
2538
FERNANDEZ, A.
2094
FERNANDEZ, R.
2922
FERNOUX, H.
2654
FERREBEE, J.W.
2170
FERRERO, E.
2433
FERRO, R.
2898
FERRUCCI, J.T., JR.
2870
FEURLE, G.
2909
FIELDING, J.F.
2574
FIGARELLA, C.
2112*
FILIPOVIC, D.
2523
FINARDI, G.
2248
FINCK, F.M.
2847*
FINDLAY, J.M.
2229*
FINKINSHTEIN, IA.D.
1994
FINTELMANN, V.
2421
FIORE, E.
2239
FISCHER, R.
2421
FISCHER, R.P.
2055*, 2442, 2876
FISCHETTI, M.
2216
FISER, B.
2393
FISH, C.A.
2027
FISHBACK, J.
2705*
FISHER, L.M.
2782*
FIVOLI, E.
2472
FLOMAN, Y.
2868
FLORESCU, N.
2919
FLUCKIGER, A.
2363
FLYE, M.W.
2862
FOCHEM, K.
2563
FODOR, L.
2904
FOLEY, K.
2014*
FONT, R.G.
2856
FORD, W.L.
2613
FORDTRAN, J.S.
2509*
FOREMNY, Z.
2545
FORGACS, S.
2436
FORKER, E.L.
2846*
FORREST, J.N., JR.
2787
FORSDYKE, D.R.
2588*
FORSGREN, L.
2276
FORTE, J.G.
2074*
FOSTER, F.H.
2605*
FOSTER, J.H.
2454
FOTTRELL, P.F.
2584*
FOX, H.
2864
FOX, R.A.
2823*
FRAME, B.
2568
FRANCIS, T.I,
2761, 2902
FRANCO, J.
2763
FRANKHUIJZEN, A.L.
2062
FRANKS, D.J.
2150
FRANZ, H.
2249
FRASER, R.
1991
FRAUCHIGER, J.P.
2511*
FRAYSSINET, C.
2172
FRECH, R.S.
2619
FREEMAN, B.W.
2054*
FREEMAN, R.
2283
FREIER, S.
2586*
FRETHEIM, B.
2314*
FREY, C.F.
2676*
FRIDRICH, R.
2251
FRIEDMANN, E.
2334
FRIEND, W.H.
2132*
FRIMMER, M.
2186
FRIZZELL, R.A.
2040
FROHLICH, J.
2140
FROHLING, W.
2139, 2151
FROMM, D.
2004*
FROMM, H.
2575
FRUHMORGEN, P.
2262
FUCHS, H.
2241
FUJII, R.
1983
FUJIMAKI, T.
2304
FUJITA, T.
2002*
FUJIWARA, M.
2058
FUKUDA, T.
2347
FULLER, R.
2641
FULLERMAN, R.W.
2631
FUMAGALLI, J.
2250
FUNDING, J.
2094, 2759
FUNG, W.P.
2469
GADACZ, T.R.
2079*
GAGAEV, G.K.
2361
GAIL, K.
2925
GAISFORD, W.D.
2281
GAJDOS, A.
2162
GAJDOS-TOROK, M.
2162
GALAMBOS, J.T.
2814*
GALANIS, N.
2712
GALJAARD, H.
1988
GALLAGER, H.S.
2668
GALLAGHER, N.D.
2014*
GALVAO-TELES, A.
2822*
GAMA RODRIGUES, J.J.
2633
GANEVAL, D.
2008*

NUMBERS FOLLOWED BY AN ASTERISK INDICATE ABSTRACTS. OTHER NUMBERS REFER TO CITATIONS.

ARBUTT, J.T., JR.
2572*
ARCIA-CARDO, A.
2558
ARCIA-CONDE BRU, F.J.
2595
ARCIA DADONI, L.
2835
ARDIKAS, C.
2398
ARG, B.D.
2194
ARNIER, H.
2218
ARTI, I.
2275
ASPA, L.
2182
ATEAU, P.
2722
ATI, T.
2422
ATSOU, P.
2398
AUDRY, P.L.
2154
AWANDE, A.S.
2336
AZZANIGA, M.
2360
EAR, M.W.L.
2230*, 2396
EFFEN, A.
2612
ELERNT, I.M.
2677*
ELFAND, M.D.
2449
EMSENJAGER, E.
2488
EORGE, J.
2289
EORGESCU, G.
2800
ERARD, A.
2836
ERBER, H.
2282
EROULANOS, S.
2392
ERSKOWITCH, V.P.
2585*
HANEM, M.
2438
IARDINI, O.
2737
IBALDI, M.
2023*
IBBONS, G.F.
2167
IEN, L.
2518
IESE, J.
2716
IESEN, J.
1988
ILHUUS-MOE, O.
2710*
GILLES, H.M.
2937, 2957
GILLESPIE, I.E.
2087*
GILLET, M.
2651
GILLETT, D.J.
2757
GILLIAVOD, S.
2887
GINSBERG, B.
2083*
GIORGINI, G.L., JR.
2289
GIRARD, M.
2926
GIRASOLE, R.V.
2809
GIZYCKA, I.
2485
GJONE, E.
2417
GLASS, G.B.J.
1976*
GLENDE, E.A., JR.
2128*
GLENN, T.M.
2116*
GLIORI, R.
2360
GLOBER, G.
2396
GLUECK, C.J.
2705*
GOBEL, D.
2900
GOEBELL, H.
2123, 2825*
GOLDMAN, A.S.
2185
GOLDMAN, J.K.
2188
GOLDSTEIN, M.S.
2212*
GOLDSTEIN, R.
2586*
GOMPELS, B.M.
2328
GONZALEZ, M.A.
2219
GOODALE, R.L.
2438
GOODMAN, M.D.
2357
GOPALAKRISHNAMURTHY, H.R.
2948
GORBACH, S.L.
2075*
GORDEN, P.
2509*
GORDON, E.M.
2171
GORDON, E.R.
2180
GOSCINSKA, Z.
2721
GOSSET, F.
2714
GOTTSCHALK, E.
2340
GOUDIE, J.H.
2430
GOULDING, R.
2768*
GOULIS, G.
2544
GOULSTON, K.
2616, 2642
GOULSTON, K.J.
2611*
GOURLAY, S.J.
2125*
GOYAL, R.K.
2067
GRADY, G.F.
2787, 2885*
GRAHAM, E.
2404
GRANERUS, A.K.
2071*
GRANIC, K.
2725
GRANIC, M.
2725
GRASSI, G.
2472
GRAWE, L.
1975*
GRAY, C.
2001*
GREENBAUM, D.S.
2610*
GREENBERG, E.I.
2514
GREENBERGER, N.J.
2011*
GREENOUGH, W.B., III
2020*
GREENSTEIN, A.J.
2149
GREER, H.A.
2580*
GREGG, M.B.
2785
GREGOR, O.
2483
GREGORY, D.W.
2931
GREIDER, M.H.
1975*
GRENBENIUK, V.N.
2361
GRICE, H.C.
2199
GRIFFITHS, L.A.
2206
GRIGORESCU-SIDO, P.
2961
GRILL, W.
2689
GRIVAUX, M.
2391
GROLL, A.
2588*
GROSSMAN, M.I.
2101

GROSSO, G.
2069, 2070
GROSZ, C.R.
2520
GROSZMANN, R.
2815
GROSZMANN, R.J.
2811*
GROVER, K.S.
2247
GRUN, M.
2774
GRUNDHOFER, B.
2023*
GRUNDY, S.M.
2741
GRUNNET, N.
2161
GRZYBEK, H.
2545
GUDAT, F.
2246
GUDMAND-HOYER, E.
2274
GUDOWSKI, G.
2798
GUE, S.
2670
GUERRE, J.
2306
GUIX GARCIA, L.
2595
GULATI, S.P.
2892
GULLER, R.
2246
GULLO, L.
2120
GUMAA, S.A.
2932
GUNAWARDENE, K.R.W.
2793
GUNNINK, M.
2143
GUPTA, B.B.
2428
GUPTA, H.D.
2428
GUPTA, R.L.
2179
GUPTA, S.S.
2429
GUSTAFSSON, J.A.
2185
GUTSTEIN, S.
2404
GUZZON, V.
2433
GYR, K.
2246, 2488
HABERICH, F.J.
2022*
HABR GAMA, A.
2633
HACKER, E.J., JR.
2270
HADDAD, J.
2527
HADDOW, J.E.
2027
HAECK, W.
2450
HAGHIGHI, P.
2557
HAGHSHENAS, M.
2557
HAHNLOSER, P.
2222
HAIMOV, M.
2514
HAJDU, I.
2436
HAJDUKOVIC, R.
2523
HAKANSON, R.
1971*
HALL, D.W.R.
2063
HALL, W.H.
2493
HALLIDAY, J.P.
2154
HALLIDAY, J.W.
2812*
HALPERN, N.V.
2496
HALSTED, C.H.
2583*
HAMILTON, R.F.
2351
HAMPEL, K.E.
2421
HAMZA, K.N.
2411*
HANKINS, J.R.
2342
HANSEN, J.D.L.
2582*
HANSEN, J.K.
2894
HANSSON, L.
2362
HARA, Y.
2035
HARDING, M.J.
2803
HARDISON, W.G.M.
2145
HARDY, J.D.
2653
HARELL, G.S.
2226
HARRIS, J.R.
1992
HARRIS, L.D.
2327
HARRIS, P.D.
2446
HARRISON, A.M.
2266
HARRISON, G.K.
2328
HART HANSEN, O.
2350
HARTEL, M.
2552
HARTSUCK, J.
2494
HARTWICH, G.
2241
HASEGAWA, M.
2347
HATTEL, T.
2838
HAUKENES, G.
2807
HAUSER, R.L.
2049*
HAVA, M.
2036
HAY, J.M.
2218
HAYASHI, K.
1970*
HAYS, D.M.
2624
HEATON, K.W.
2280
HECKHAUSEN, H.
2241
HEFFERNAN, S.J.
2451
HEFFERNON, E.W.
2335
HEIDECKE, V.
2798
HEILBRUNN, A.
2377
HEIN, G.
2359
HELANDER, H.F.
1974*
HELLER, A.
2380
HELLSTROM, K.
2006*
HENDREN, W.H.
2330
HENDRIX, T.R.
2204*
HENNECKE, A.
2307
HENNING, S.J.
2031, 2208
HEPNER G W
2202*
HERBERTSON, B.M.
2171
HERBINGER, W.
2905
HEREMANS, J.F.
2888
HERINGOVA, A.
2130*
HERMANN, G.
2326
HERMOS, J.A.
2505*
HERNANDEZ, N.
2482
HERRINGTON, J.L., JR.
2443
HERRMANN, R.P.
2408*

HERSH, T.
2067
HICKEY, R.C.
2668
HIGGINS, E.S.
2132*
HIGGINS, J.A.
1980*
HILL, B.J.
2086*
HILL, O.W.
2938
HILLEMAND, B.
2320
HILTS, S.V.
2292
HIRAMATSU, Y.
2003*
HIRD, F.J.R.
2031, 2208
HIROM, P.C.
2198
HIRSCHOWITZ, B.I.
1974*
HIRSCHOWITZ, B.L.
2496
HIWADA, K.
1970*, 2148
HJELMQUIST, U.B.E.
2157
HOBBS, K.E.F.
2844
HOCKEN, A.G.
2441
HODGES, D.
2052*
HOERR, S.O.
2495
HOFMANN, A.F.
2202*, 2575, 2592
HOFSTETTER, F.R.
2363
HOGAN, W.J.
2053*
HOLDEN, M.P.
2315*
HOLDSWORTH, C.D.
2447
HOLLE, G.
2249
HOLLENDER, L.F.
2546
HOLLINGER, F.B.
2289
HOLLINGSWORTH, J.W.
2613
HOLMES, E.C.
2884*
HOLMES, G.K.T.
2587*
HOLOMAN, J.
2840
HOLZKNECHT, R.
2261
HONG, S.S.
2109*
HONORAT, M.
2898
HORI, M.
1970*
HORN, R.
2162
HORNBROOK, K.R.
2141
HORNSTEIN, O.P.
2579
HOROWITZ, M.I.
1984
HORVATH, T.
2005*
HOWARD, R.J.
2500
HRIPACH, L.
2725
HSIA, J.C.
2183
HSIEH, C.P.
2413*
HUBER, D.H.
2775*
HUGGINS, D.
2952
HUIZENGA, K.A.
2669
HULME-MOIR, I.
2447
HULSMANN, W.C.
2209
HUME, D.M.
2782*
HUMPHREY, C.S.
2452
HUMPHREY, E.W.
2500
HUMPHREY, L.J.
2754
HUNT, T.K.
2498
HUPKOVA, V.
2840
HUR, K.B.
2228*
HURWITZ, A.
2773
IATROMANOLAKIS, N.
2398
IBAYASHI, J.
2379
IBER, F.L.
2787
IGLESIAS, O.
2887
IGNARRO, L.J.
2176
IKKOS, D.
2398
IMPERATI, L.
2471
IMPRIALOS, P.
2712
INAGAKI, O.
2347
INFERRERA, C.
1993
INOU, T.
2138
INOUE, T.
2309
INTRASUPT, S.
2752
IONESCU, M.I.
2315*
IORDACHEANU, C.
2800
IP, S.K.L.
2322
ISHAK, K.G.
2828*
ISOKOSKI, M.
2594
ISSARESCU, S.
2289
ISSELBACHER, K.J.
2018*, 2201*, 2397, 2767
ITO, Y.
1995
ITOH, R.
2305
ITOH, Z.
2089*
IVEY, K.M.
2001*
IYER, P.K.R.
2953
IZUMI, K.
2304
JABLONSKI, P.
2849*
JACKIEWICZ, Z.
2321, 2719
JACKSON, B.M.
2078*
JACOBSON, E.D.
2114*, 2494
JACOBSON, M.
2147
JADHAV, M.
2933, 2934, 2948
JAFFE, B.M.
2210*
JAGENBURG, R.
2071*
JAHJA, E.
2946
JAHN, L.
2798
JAHN, W.
2190
JAKUBOWSKA, D.
2576
JALAN, K.N.
2678*
JAMES, D.G.
2823*
JAMES, J.M.
2714
JANICKI, W.
2531
JANKAU, O.
2719
JANOWITZ, H.D.
2406*, 2608*, 2677*
JAPUNDZIC, I.
2152, 2175

JAPUNDZIC, M.
2152, 2175
JARDIM, M.F.
2317
JARKOWSKI, T.L.
2292
JAROS, R.
2525
JARRETT, F.
2423
JAYASWAL, C.L.
2068
JEFFERS, A.
2441
JELLUM, E.
2314*
JENDEN, D.J.
2100
JENIS, E.H.
2828*
JENKINS, D.H.R.
2060
JENNY, S.
2250, 2262
JENSEN, H.E.
2407*, 2409*, 2414*, 2445
JERNE, D.
2894
JIRSA, M.
2130*
JIRSOVA, A.
2130*
JOCU, I.
2301
JOFFE, N.
2873
JOHANSEN, A.
2639
JOHANSSON, H.
2463
JOHNSON, J.W.
2874
JOHNSON, K.M.
2781*
JOHNSON, L.R.
2081*, 2114*
JOHNSON, P.
1972*
JOHNSTON, D.
2452
JOHNSTON, S.D.A.
2465
JOKINEN, K.
2897
JONES, D.P.
2784
JONES, E.L.
2311*
JONES, R.S.
2125*
JORDAN, G.L.
2623
JORDAN, G.L., JR.
2707*
JORDAN, P.H., JR.
2090*, 2426
JORI, G.P.
2729*
JOSHI, V.R.
2939*, 2956
JOVER, J.
2457
JUANTEGUY, J.M.
2537
JULER, G.L.
2631
JUNIPER, K., JR.
2278
JUSSAWALLA, D.J.
2605*
JUSSILA, J.
2594
KAGAN, R.
2269
KAGAWA, M.
2817
KALANT, H.
2160, 2300
KALAYASIRI, C.
2752
KALICA, A.R.
2882*
KALINA, V.O.
2238
KALINA, Z.
2545
KALOW, W.
2183
KAMENZ, E.
2635
KAMINSKI, W.
2329
KAN, CH.
2388
KANAGAWA, H.
2310
KANAGHINIS, T.
2398
KANG, S.
2271
KANIA, B.
2303
KAPELLER, J.
2119
KAPIKIAN, A.Z.
2882*
KAPLAN, E.L.
2086*, 2210*
KAPLAN, M.S.
2410*
KAPOOR, O.P.
2939*, 2950, 2956
KAPOOR, S.K.
2841
KAPPEL, D.A.
2762
KARDEL, T.
2844
KARIM, S.M.M.
2098
KARJALAINEN, J.
2730*
KARK, A.E.
2621
KARL, I.E.
2751
KASHII, A.
2755
KASSNER, E.G.
2528
KATER, L.A.
2610*
KATO, K.
2567
KATS, I.Z.
2217
KATVNARIC, D.
2264
KATZ, S.
2227*
KATZ, S.E.
2446
KAUFMAN, H.J.
2416*
KAVLIE, H.
2513
KAWAI, Y.
2331
KAYASSEH, L.
2671
KAYNAN, A.
2149
KAZANTSEVA, I.A.
2373
KEATING, J.P.
2751
KEENAN, W.J.
2124*
KELEMEN, L.
2917
KELLEHER, J.
2016*, 2017*
KELLY, K.A.
2669
KELTNER, R.M.
2203*
KERAMIDAS, D.
2702
KERESTELY, J.
2917
KERLEY, R.
2201*
KERNITSKAIA, N.S.
2871
KERRIGAN, G.
2396
KESZLER, P.
2422
KETTERER, H.
2909
KEUSCH, G.T.
2885*
KHANDEKAR, J.D.
2194
KHANNA, J.M.
2160
KHANNA, R.S.
2953
KHARAT'IAN, A.M.
2600
KHATRI, I.M.
2811*, 2815
KHEIR, S.
2668

KHRISTOV, KH.
2656
KIBLER, J.
2554
KIKUCHI, H.
2859
KILDEBERG, P.
2915
KIM, H.B.
2963
KIM, H.K.
2109*
KIM, J.P.
2214
KIMURA, I.
1995
KIMURA, K.
2331
KINDT, C.W.
2124*
KING, B.
2283
KING, C.R.
2207
KING, D.R.
2687
KINNE, R.
2108*
KIPNIS, D.M.
2751
KIRK, R.M.
2425
KIRSNER, J.B.
2679*, 2784
KITA, T.
2819
KITAGAWA, T.
2765
KLAREWICZ, E.
2481
KLEIN, J.B.
2847*
KLEIN, N.E.
2386
KLEINER, A.I.
2095
KLEINMAN, M.S.
2607*
KLUGE, T.
2314*
KNEZEVIC, S.
2573
KNOBLOCK, H.W., JR.
2478, 2479
KNOCH, H.G.
2635
KNUDSON, J.
2756
KOBAYASHI, S.
1970*
KOCK, N.G.
2222
KOGA, S.
2354
KOGAN, A.S.
1994
KOGURE, H.
2755
KOHLER, P.F.
2778*
KOKUBU, R.
2148
KOKUBU, T.
1970*
KOLASINSKA, W.
2355
KOLIBABA, S.S.
2512
KOLLOCH, R.
2153
KOLODYNSKA, Z.
2158
KOLONITSKII, A.T.
2960
KOMPF, A.
2659
KONIG, K.J.
2307
KONRAD, G.
2917
KONTUREK, D.
2355, 2913
KONTUREK, S.
2355, 2913
KONTUREK, S.J.
2114*
KOORNHOF, H.J.
2769
KOPEC, Z.
2119
KOPIN, I.J.
2066
KOPPANG, H.S.
2710*
KORANSKY, W.
2142
KORELITZ, B.I.
2608*
KORINEK, J.
2297
KORNEV, I.I.
2378
KORNFELD, D.S.
2446
KORSRUD, G.O.
2199
KORTEZOVA, N.I.
2045*
KOSHI, G.
2948
KOSSLING, F.K.
2810
KOTELANSKI, B.
2811*, 2815
KOUDAHL, G.
2497, 2759
KOUREA-KREMASTINOU, T.
2930
KOVACEVIC, D.
2264
KOVACS, K.
2194
KOVALESKI, B.
2763
KOYTCHA, F.
2382
KRAFFT, L.
2674
KRAFT, A.R.
2348
KRAGELUND, E.
2407*, 2409*, 2414*, 2445
KRAKOFF, I.H.
2893
KRAMER, H.S.
2758
KRAUSE, D.
2261
KRAUSS, H.
2774
KRAVCHENKO, L.F.
2346
KRAWCZYNSKI, K.
2779*
KRAWITT, E.L.
2024*
KRONBORG, O.
2350, 2487
KRSTULOVIC, B.
2573
KUIPER, D.H.
2610*
KUMAR, H.
2264
KUMAR, V.
2841
KUMMER, H.
2511*
KUNLIN, A.
2218
KUNTZMAN, R.
2147
KUNZ, O.
2385
KUNZLI, H.F.
2251
KURGANSKAIA, A.V.
2346
KURIHARA, M.
2605*
KURIYAMA, K.
2178
KURT, E.J.
2271
KUSABA, R.
2138
KYD, P.A.
2136
LAFARGE, C.
2172
LAFAZANIS, B.
2923
LAGACHE, G.
2720
LAGADEC, B.
2722
LAGERON, A.
2742
LAGUNOVA, I.G.
2378
LAM, K.C.
2804*
LAMBOTTE, L.
2030

LAMERS, J.M.J. 2209
LAMONT, J.T. 2767
LANCIAULT, G. 2091*
LANDER, J.J. 2777*
LANDRIGAN, P.J. 2775*
LANE, D. 2451
LANGERON, P. 2550
LANGMARK, F. 2746
LANGNER, R. 2144
LANGSAM, A.A. 2879*
LARKINS, R.G. 2694
LARRAIN, A. 2312*
LARROUDE, C. 2259, 2394
LATASTE, J. 2713
LAUDANO, O. 2887
LAUNIALA, K. 2594
LAW, G.T. 2839
LAWRENCE, L.R. 2658
LAWRIE, B. 2231*
LAWSON, H.H. 2473
LAZAR-GAROIU, F. 2961
LAZARKIEWICZ, B. 2554
LAZECKI, L. 2533
LEBERL, C. 2142
LEDESMA, E.M. 2648
LEDOUX-LEBARD, G. 2236
LEDUC, L. 2289
LEE, E.R. 2474
LEE, J.S. 2013*
LEE, L.E., JR. 2493
LEE, N.H. 2109*
LEE, S. 2170
LEE, W.H. 2058
LEE, Y.H. 2093
LEEK, B.F. 2059
LEEVY, C.M. 2813*
LEFER, A.M. 2116*
LEGG, M.A. 2680
LEGIEWSKI, A. 2367
LEGUTKO, L. 2721
LENA, A. 2516
LENNETTE, E.H. 2291, 2796
LENROIT, J.P. 2843
LEPORE, M.J. 2776*
LERNER, J. 2029
LESTER, R. 2027
LEUCHT, B. 2798
LEUZ, C.A. 2450
LEV, R. 1976*
LEVEEN, H.H. 2879*
LEVEY, G.S. 2072
LEVINE, R.A. 2083*
LEVY, L.M. 2525
LEWIS, E.A. 2902
LEWIS, G.P. 1986
LEWIS, L. 2786
LIAVAG, I. 2418, 2419
LICASTRO, R. 2558
LIE, T.S. 2153
LIEHR, H. 2774
LIEN, W.M. 2734
LIGUORY, C. 2233*, 2722
LILLEHEI, R.C. 2220
LIM, R.C., JR. 2756
LIN, T.Y. 2743
LINDE, N.C. 2805
LINDEN, G. 2605*
LINDQUIST, B. 2463
LINSCHEER, W.G. 2295
LINSTRAND, K. 1971*
LINTON, R.R. 2629
LIPITZ, L.R. 2784
LIST, J.W. 2410*
LIU, Y.K. 2505*
LIVOLSI, V.A. 2866
LJUNG, B. 2362
LLEDO MATOSES, S. 2553
LOCALIO, S.A. 2658
LOCATELLI, G. 2329
LOEWENTHAL, M. 2551
LOISANCE, D.Y. 2843
LOKICH, J.J. 2695
LOMAS, F. 2234*
LOMAZOVA, M.M. 2458
LONG, R.A. 2183
LOPEZ GIBERT, J. 2457
LOSOWSKY, M.S. 2016*, 2017*
LOUKANOV, Y. 2057
LOURIA, D.B. 2816
LOUVEL, A. 2306
LOUW, J.H. 2288
LOVRENCIC, M. 2264
LOW-BEER, T.S. 2280
LOWENFELS, A.B. 2517
LOWENHOFF, I. 2721
LUBCKE, P. 2261
LUBIN, J. 2665
LUCIAK, M. 1997
LUCIEN, H.W. 2089*
LUDBROOK, J. 2744
LUISIER, A.L. 2028
LUKASH, N.V. 2718

LUKICHEV, P.M.
2238
LUNDSGAARD-HANSEN, P.
2511*
LUNEVA, T.E.
2456
LUTTON, C.
2073
LYLLOFF, K.
2783*
LYNCH, J.A.
2727
MACDONALD, A.S.
2171
MACHALSKI, M.
2545
MACHEN, T.E.
2135
MACKAY, B.
2668
MACKINTOSH, P.
2587*
MACLEOD, I.B.
2060
MACMANUS, J.P.
2150
MACPHERSON, S.G.
2164
MADALINSKI, K.
2779*
MAEGRAITH, B.G.
2937
MAEIR, D.M.
2586*
MAGALHAES, A.F.N.
2502
MAGISTRO, D.
2007*
MAGNUSSON, T.
2071*
MAHALUXMIVALA, S.M.
2356
MAIANSKII, D.N.
2200
MAINOUS, E.G.
2758
MAINWARING, A.R.
2864
MAKINO, I.
2854*
MAKRIS, G.
2712
MALIK, K.
2428
MAMAEVA, Z.K.
2490
MANAKA, J.
2755
MANNS, J.J.
2577
MANSBACH, C.M., II
2572*
MANSUROV, KH.KH.
2388
MANTELLINI, E.
2564
MAOUNIS, F.
2852*
MARAKAMI, K.
2102, 2104
MARANO, R.
2581*
MARC, J.
2394
MARCHE, C.
2008*, 2655
MARCHE, J.
2655
MARCHESE, L.T.
2724
MARCHIORO, T.L.
2513
MARCU, C.
2800
MARECHAL, A.
2836
MARINACCIO, F.
2471
MARK, B.
2264
MARKKANEN, T.
2858
MARKS, I.N.
2590
MARKUM, A.H.
2801
MARMION, B.P.
2282
MARSHAK, R.H.
2608*
MARSHALL, J.C.
2822*
MARSHALL, M.L.
2828*
MARSHALL, P.C.
2027
MARSHALL, V.R.
2744
MARTIN, F.I.R.
2694
MARTIN, J.P.
2834
MARTIN, R.G.
2668
MARTINEK, J.
2321
MARTINEZ, D.R.
2776*
MARTINEZ, I.
2605*
MARTINI, G.A.
2844
MARTONO
2946
MARVER, H.S.
2731*
MASELLA, A.
2555
MASHIMO, K.
2854*
MASON, E.C.
2803
MASON, G.R.
2368
MASTERS, Y.F.
2837
MATA, L.J.
2922
MATERN, S.
2139
MATHEWSON, C., JR.
2578
MATONDANG-SIAHAAN, C.
2801
MATSANIOTIS, B.
2852*
MATSUDA, Y.
2159
MATSUMOTO, T.
2386
MATSUMOTO, Y.
2331
MATTAR, G.
2480
MAURER, W.
2196
MAURSETH, K.
2746
MAWER, G.E.
2753
MAX, M.H.
2169
MAXWELL, W.G.
2769
MAYNARD, E.P.
2526
MAYROGEORGES, G.
2690
MAZAC, V.
2483
MAZILINA, R.V.
2460
MBOI, N.
2895
MCCABE, E.R.B., III
2177
MCCARTHY, C.F.
2603
MCCARTHY, C.G.
2584*
MCCARTHY, H.F.
2708*
MCCARTHY, J.D.
2863
MCCORMICK, J.N.
2282
MCCULLOUGH, F.S.
2011*
MCDIVITT, R.M.
2609*
MCDONOUGH, J.M.
2454
MCFARLANE, H.
2589
MCGINN, T.G.
2777*
MCGREGOR, J.G., JR.
2292
MCGUIGAN, J.E.
1975*, 2412*
MCHARDY, G.
2316
MCINTYRE, P.A.
2583*

MCKAY, J.L.
2643
MCKENNA, P.J.
2776*
MCLAUGHLAN, J.M.
2199
MCLAUGHLIN, J.S.
2342
MCLEOD, G.M.
2744
MC MAHON, W.A.
2643
MCMANUS, J.P.A.
2678*
MCMARTIN, C.
1986
MCMULLIN, J.P.
2451
MCNAIR, A.
2519
MC NICHOLL, B.
2584*
MCQUAIDE, J.R.
2308
MCSWEEN, R.N.M.
2164
MEEROFF, J.C.
2286, 2434
MEEROFF, M.
2434
MEHIGAN, J.A.
2451
MEHL, H.J.
2661
MEHTA, J.M.
2738
MEIER, A.L.
2488
MEIISEL, P.
2293
MEIJER, D.K.F.
2143
MEKHJIAN, H.S.
2687
MELET, J.
2713
MELKI, G.
2243
MENDOZA, C.B., JR.
2542
MENGUY, R.
2837
MENNE, P.A.
2366
MENNY, M.
2250
MERETO, G.C.
2069, 2070
MERRILL, D.A.
2778*
MESARD, L.
2493
METCALF, P.J.
2565
METREWELI, C.
2256
METZGER, D.G.
2351
MEYER, C.
2546
MEYER, J.
2649
MEYER, U.A.
2731*
MEYER ZUM BUSCHENFELDE, K.H.
2810
MIEDERER, S.E.
2096, 2097
MIESCHER, P.A.
2810
MIGASENA, S.
2937
MIKHAILOVA, L.S.
2924
MIKI, S.
2347
MIKKELSEN, M.
2795
MIKULAJOVA, M.
2119
MIKULIAK, V.G.
2871
MILKOV, G.
2959
MILKOVA, L.
2656
MILLA, J.
2949
MILLBURN, P.
2198
MILLER, D.R.
2762
MILLER, D.S.
2029
MILLER, I.D.
2561
MILLER, N.E.
2753
MILLER, S.E.P.
2164
MILLERET, P.
2651
MIMIC-OKA, J.
2152, 2175
MIN, K.S.
2228*
MINAEVA, O.D.
2378
MINDIRIGIO, B.
2551
MINTZ, D.H.
2072
MIR PALLARDO, J.
2700
MISTILIS, S.P.
2804*
MITANI, S.
2755
MITROFANOFF, P.
2382
MITROPOULOS, K.A.
2167
MIZUNO, K.
2138
MODENA, J.L.P.
2284
MOHAMMED, I.
2902
MOHRMAN, M.E.
2192
MOLDOVAN, V.
2917
MONFORT ALBELDA, R.
2420
MONSOUR, J.W.
2326
MONTEFIORE, D.
2902
MONTI, M.
2239
MOODY, F.G.
2496
MOOKERJEE, G.C.
2247
MOORE, R.B.
2025*
MORAES, J.P.P., JR.
2693
MORAITOU, M.
2923
MORALI, A.
2544
MORAVA, E.
2005*
MOREL, C.J.
2470
MORELLO, D.C.
2386
MORGENSTERN, L.
2269, 2349, 2352, 2375
MORI, K.
2402
MORI, Y.
2347
MORIN, C.
2333
MORRISON, S.
2001*
MOSELLA, G.
2555
MOSENTHAL, W.T.
2265
MOSIN, V.I.
2437
MOSKAL, M.
2666
MOTHES, W.
2661
MOTT, C.B.
2120, 2942
MOULANG, J.
2043*
MROZOWSKI, D.
2039
MUGIKURA, M.
2383
MUIR, C.S.
2605*
MUKAI, S.
2567
MUKHERJEE, T.
2744
MULE, J.E.
2336

NUMBERS FOLLOWED BY AN ASTERISK INDICATE ABSTRACTS. OTHER NUMBERS REFER TO CITATIONS.

MULIADI, W.
2895
MULLANE, J.F.
2137, 2876
MULLEN, J.L.
2091*
MULLER, W.
2806
MUNCK, B.G.
2019*
MUNOZ GOMEZ, C.
2700
MUNOZ IBANEZ, M.
2700
MURPHY, G.D., III
2775*
MURPHY, W.R.
2500
MURUGASU, J.J.
2403
MUSIKABHUMMA, S.
2537
MUTCHLER, J.H.W.
2515
MYANT, N.B.
2167
MYBURGH, J.A.
2156, 2165
MYERS, R.M.
2933, 2934
MYLOTTE, M.
2584*
MYLOTTE, M.J.
2603
NAGAMACHI, Y.
2076*
NAGARATNAM, N.
2793
NAGASE, T.
2304
NAGEL, G.A.
2246
NAHRWOLD, D.L.
2088*
NAJARIAN, J.S.
2561, 2619
NAKAGAWA, S.
2854*
NAKAJI, N.T.
2170
NAMDARAN, F.
2826*
NANCE, F.C.
2416*, 2856
NAPIERALA, M.
2659
NARZYKULOVA, S.A.
2789
NASR, K.
2557
NASRALLAH, S.M.
2277
NATALE, C.
2471
NATER, H.R.
2295
NATH, I.
2191
NATHAN, M.J.
2629
NATHWANI, B.N.
2939*
NAUMOV, G.
2293
NAVEIRO, J.J.
2470
NAYAK, N.C.
2191
NDIKA, L.I.L.
1985
NECHAEVA, T.I.
2238
NEGUT, M.
2919
NEIGER, A.
2298
NELSON, A.R.
2448
NELSON, J.H.
2879*
NELSON, V.
2763
NERURKAR, M.G.
2738
NESTEL, P.J.
2818
NEUBERGER, H.O.
2825*
NEUMAYR, A.
2570
NEVES, D.P.
2693, 2942
NEWTON, N.E.
2141
NGUYEN, T.L.
2033
NICOLOFF, D.M.
2536
NIEDERLAND, T.R.
2840
NIEDOBITEK, C.
2667
NIEDOBITEK, F.
2667
NIELSEN, O.E.
2838
NIELSEN, P.M.
2805
NIEPOLOMSKI, W.
1997
NIKODEM, W.
2657
NILSSON, G.
2084*
NINO, R.
2558
NISHIO, H.
2365
NISHIO, O.
1995
NISHIYAMA, K.
2304
NITZSHE, L.
2548
NOGUEIRA, J.R.
2326
NOLAN, D.J.
2872
NOMURA, K.
2347
NORBACK, D.H.
2353
NORDENFELT, E.
2783*
NORDGREN, B.
2463
NORMAN, J.
2529
NORTHRUP, W.F., III
2696
NOTMAN, J.
2769
NOVIS, B.N.
2590
NOWOSLAWSKI, A.
2779*
NUGENT, F.W.
2680
NUMA, S.
2146
NUSBAUM, M.
2042*, 2883*
NYHUS, L.M.
2075*, 2211*, 2313*, 2325
O'DELL, N.M.
2580*
OBER, W.B.
2370
OBERFIELD, R.A.
2606*
OBERHALMAN, H.A., JR.
2562
OBOJSKA, K.
2158
OCKNER, R.K.
2012*
ODOULAMI, H.
2748
OESMAN, I.N.
2801
OGATA, K.
2195
OGAWA, K.
2331
OGDEN, L.
2745
OH, C.
2621
OHARA, N.
2159
OHKAWA, H.
2046*
OHSHIMA, T.
2304
OIGAARD, A.
2519
OKABE, S.
2837
OKAMOTO, E.
2556
OKIES, J.E.
2623
OKUBADEJO, M.
2589

OKUBADEJO, O.A.
2902
OKUMURA, J.
1970*
OLANDER, G.A.
2927
OLESEN, H.
2795
OLIVERA, J.
2434
OLSEN, J.
2094
OLSSON, R.
2832
OMOLE, A.A.
2117*
ONG, G.B.
2733*
ONORANTE, I.
2360
ONYEWOTU, I.I.
2902
OPOLON, P.
2844
OPPENHEIMER, E.H.
2685*
ORAHOOD, R.C.
2118*
ORECCHIA, C.
2472
ORELL, S.
2276
ORLOFF, M.J.
2170
ORRINGER, M.B.
2620
OSTROW, J.D.
2129*
OTTAVIANI, G.
2026
OTTE, J.B.
2649
OTTENI, F.
2546
OTTENJANN, R.
2092, 2097, 2252, 2358
OTTINGER, L.W.
2629
OTTO, H.F.
1981*
OWMAN, C.
1971*
OYEDIRAN, A.B.O.O.
2902
OZAKTAY, S.Z.
2612
PADEY, K.K.
2467
PAEZ, C.
2250
PAGET, E.T.
2578
PAGLIANO, G.
2546
PAGLIARA, A.S.
2751
PAINTER, N.S.
2604*
PALAO ESTEVE, J.
2595
PALMER, E.D.
2453
PANAYOTOPOULOS, E.
2712
PANDE, H.
2807
PAPADATOS, K.
2930
PAPADIMITRIOU, T.
2690
PAPAEVANGELOU, G.
2930
PAPAPANAYOTOU, J.
2923
PAPAZOVA, M.
2045*
PAPAZOVA, M.P.
2057
PAQUET, K.T.
2827*
PARC, R.
2218
PAREJA, J.C.
2724
PARENZAN, L.
2329
PARIS, J.
2836
PARIS, J.C.
2836
PARK, Y.O.
2228*
PARKER, G.W.
2873
PARRILLA PARICIO, P.
2553
PARROTT, D.M.V.
1990
PARSZEWSKI, M.
2039
PASIEWICZ, J.
1997, 2545
PASRICHA, A.
2958
PASRICHA, J.S.
2958
PASSARO, E., JR.
2287, 2881*
PASTORE, G.
2581*
PATALAY, V.E.
2626
PATIN, C.S.
2349
PAYNE, P.M.
2605*
PEARCE, M.L.
2851*
PEARSON, M.J.
2694
PECAU, Y.
2686*
PECORA, D.V.
2477
PEDERSEN, E.
2605*
PEDERSEN, G.
2519
PEDERSEN, T.
2350
PEDERSON, R.A.
2080*
PEDINI, G.
2248
PEDOWITZ, W.J.
2879*
PELLET, M.M.
2843
PELOT, D.
2272
PENA, A.S.
2396
PENAUD-LAURENCIN, J.
1979*
PENISTON, W.O.
2578
PEQUIGNOT, H.
2306
PERDIKIS, P.
2518
PERDUE, G.D., JR.
2842, 2889
PERERA, W.D.A.
2037
PEREZ, R.
2686*
PERONNEAU, P.A.
2843
PERQUIS, P.
2898
PERROTT, N.
2804*
PERZIN, K.H.
2866
PESCHLE, C.
2729*
PESKIN, G.W.
2086*, 2210*
PETER, M.E.
2507*
PETERMANN, J.
2258
PETERS, C.J.
2781*
PETRI, C.
2597
PETRI, S.
2597
PETRITSCH, P.
2541
PETROV, B.
2338
PETROVA, A.N.
2460
PETZOLD, H.
2244
PEYDRO OLAYA, A.
2553
PFEFFERMANN, R.
2868
PHILLIPS, E.
2093
PICCONE, V.A.
2879*

PIEDAD, O.H.
2875
PIERA MAS-SARDA, J.
2457
PIETRUSZKO, R.
2127*
PIMPARKAR, B.D.
2738
PINOTTI, H.W.
2538, 2633, 2857
PIPER, D.W.
2408*
PISSIOTIS, C.A.
2211*
PITTMAN, J.P.
2012*
PLENGVANIT, U.
2752
POHOWALLA, J.N.
2831
POINTER, H.
2111*
POIRIER, V.C.
2504*
POLIVKA, J.A.
2673
PONCELET, P.
2704*
PONKA, J.L.
2499
PONTES, J.F.
2857
POPA, L.M.
2792
POPOVIC, N.A.
2137
POPOVICI, M.
2919
PORTER, A.
2907
PORTER, J.M.
2535
PORTER, M.
2866
PORTOCALA, R.
2792
POSPELOVA, V.V.
2217
POULSEN, H.
2783*
POWELL, L.W.
2812*
POWIERZA-KACZYNSKA, C.
2797
PRADHAN, D.J.
2537
PRAKASH, O.M.
2958
PRANGE, I.
2855
PREISER, H.
1973*
PREISIG, R.
2844
PRESCOTT, R.J.
2229*
PRESENT, D.H.
2608*, 2677*
PRESHAW, R.M.
2085*
PRESTCOTT, R.J.
2678*
PRESTON, D.J.
2343
PRETER, B.
2250
PRICE, J.B., JR.
2169, 2866
PRICE, M.R.
1992
PRICE, S.
2565
PRIMACK, A.
2732*
PRODROM, I.
2954
PROKOP, M.
2637
PROSSER, C.L.
2046*
PROUT, B.J.
2256, 2634
PRZEDPELSKI, S.
2692
PUCSOK, J.
2422
PURCELL, R.H.
2777*
QAQUNDAH, B.Y.
2688
QUILICHINI, F.
2516
RABSON, A.R.
2769
RADUGIN, K.B.
2337
RAIA, A.
2527, 2633
RAID, N.
2941*
RAINSFORD, K.D.
1972*
RAKHIMOVA, N.G.
2217
RAM, M.D.
2539
RAM, S.
2540
RAMERO, E.
2364
RAMIREZ, H.
2715
RAMOS, M.
1982
RANSON, J.H.C.
2658
RAQUEL, J.A.
2542
RARINCA, A.
2955
RASANEN, O.
2897
RASCHKE, E.
2827*
RASHID, S.
1996
RATTAN, S.
2067
RAWAT, A.K.
2178
READ, A.E.
2231*
READ, R.C.
2493
REALINI, S.
2363
RECORD, C.O.
2771
REDDY, S.
2589
REDDY, V.
2037
REDINGER, R.N.
2038, 2134*
REEDER, D.D.
2078*, 2157
REEMTSMA, K.
2706*
REES, A.C.
2731*
REHFELD, J.F.
2255
REINICKE, V.
2783*
REISS, E.
2086*
REISSELL, P.
2730*
REITTER, F.H.
2171
RELLAN, D.R.
2940*
RENKIELSKI, K.
2321
RENNING, J.A.
2706*
RENSING, L.
2144
RENTSCH, I.
2381
REPANOVICI, R.
2792
REPETTO, L.M.
2644
REYMONDON, L.
2898
REYNOLDS, D.G.
2213*
RHODES, J.
2492, 2931
RIBERA, L.
2457
RICE, R.
2228*
RICEVUTI, G.
2182
RICHELME, H.
2435
RICHIE, J.P.
2736
RICHTER, E.
2774
RICHTER, K.
2359

RICHTER, W.R. 2121
RIDGON, R.H. 2891
RINGERTZ, N. 2605*
RITCHIE, J.K. 2675*
RITCHIE, W.P., JR. 2055*, 2442, 2876
RITTENHOUSE, E.A. 2534
ROBACK, S.A. 2536
ROBERTO, R.R. 2796
ROBERTS, S.A. 2166
ROBERTSON, D.J. 2156
ROBERTSON, J.W.K. 2585*
ROBILOTTI, J.G., JR. 2776*
ROBINSON, J.W.L. 2028
ROBSON, A.J. 2171
ROCA, M. 2396
ROCH, M. 2100
RODGERS, J.B. 2015*
RODING, B. 2222
RODRIGO GOMEZ, J.M. 2595
ROESER, H.P. 2812*
ROESSNER, A. 2153
ROGALSKI, E. 2481
ROGE, J. 2714
ROGER, B.H.G. 2679*
ROGGIN, G.M. 2204*
ROLAND, M. 2418, 2419
ROLLINGHOFF, M. 2799
ROLLINGHOFF, W. 2799
ROLLINS, E.L. 1978*
ROMINO, J.D. 2566
RONKALSRUD, E.W. 2736
ROON, A.J. 2368
ROPARTZ, C. 2834
ROSALES, R. 2922
ROSATO, E.F. 2091*
ROSATO, F.E. 2091*
ROSCH, W. 2092, 2468
ROSE, E.F. 2632
ROSEN, A. 2006*
ROSEN, L.W. 2610*
ROSENBAUM, K.D. 2258
ROSENBERG, D. 2502
ROSENBERG, I.L. 2630
ROSENBERG, J.L. 2784
ROSENTAHL, S.R. 1986
ROSZKOWSKI, S. 2303
ROTH, R.R. 2442
ROUDIL, C. 2333, 2921
ROY, C.C. 2596
ROYLANCE, J. 2280
ROZIN, R.R. 2868
RUDICK, J. 2406*
RUIZ, J.O. 2220
RUNSER, C. 2651
RUOFF, H.J. 2105, 2107
RUSSELL, R.I. 2585*
RYBAK, B.J. 2514
RZYMSKI, K. 2260
SABNIS, A.M. 2956
SACHDEV, K.N. 2821*
SACHS, G. 2108*
SACKAJA, I.S. 2378
SADRIEH, M.. 2826*
SAENZ LOPEZ DE RUEDA, F. 2914
SAHADEVAN, V. 1991
SAHI, T. 2594
SAHUT D'IZARN, J.J. 2236
SAITO, M. 2205
SAKAKIHARA, Y. 2042*
SAKUMA, F. 1995
SALESSIOTIS, N. 2371
SALGANIK, R.I. 2099
SALMON, P. 2231*
SALVADOR, R. 2457
SAMUEL, P.D. 2430
SAND, T. 2235*
SANDERS, D.Y. 2647
SANDERS, M.G. 2571*
SANFELIPPO, P.M. 2663
SANJOSE, G. 2364
SANOU, S. 2366
SANZENBACHER, L.J. 2687
SAPALA, J.A. 2499
SARLES, H. 2120
SARTI, F. 2239
SATLER, J.J. 2042*
SATO, S. 2173
SAUNDERS, J. 2087*
SAUNDERS, S.J. 2582*
SAUSE, H.W. 2093
SAUTTER, V. 2896
SAVAGE, T.R. 2653
SAVILAHTI, E. 2508*
SAVINO, L. 2860
SAWAE, G. 2159
SBUELZ, B. 2472
SCHACHER, J.F. 2886
SCHADEWALD, T. 2891
SCHAFER, E. 2799
SCHALLER, R.T. 2867
SCHALLY, A.V. 2089*
SCHARPLATZ, D. 2717

SCHEDL, H.P.
2010*
SCHEEL, D.
2705*
SCHELLHORN, W.
2242
SCHENK, W.G., JR.
2222
SCHEUER, P.J.
2780*
SCHICKEDANZ, H.
2569
SCHIEBER, W.
2510*
SCHILLER, W.R.
2515
SCHIMMEL, E.M.
2571*
SCHIRALDI, O.
2581*
SCHISCHKE, B.
2186
SCHIZGAL, H.M.
2212*
SCHLEGEL, J.F.
2041*
SCHLICHT, I.
2142
SCHLOERB, P.R.
2207
SCHLOTE, W.
2151
SCHLOTT, K.A.
2123
SCHMAMAN, A.
2518
SCHMID, E.
2421
SCHMIDT, A.
2532
SCHMIDT, E.
2548
SCHMIDT, F.R.
2863
SCHMIDT, N.J.
2291, 2796
SCHMIDT, W.M.I.
2072
SCHNACK, H.
2833
SCHOLZE, H.
2279
SCHON, K.
2962
SCHON, R.
2240
SCHRAMM, H.
2569
SCHROTER, J.
2802
SCHRUMPF, E.
2235*
SCHULTE-HERMAN, R.
2142
SCHULTE, W.J.
2479
SCHULTZ, L.S.
2220
SCHULTZ, S.G.
2040
SCHULTZE, B.
2196
SCHULZ, M.R.
2674
SCHUSSHEIM, A.
2525
SCHWARTZ, M.Z.
2025*
SCROCCA, A.
2555
SEGAL, J.E.
2434
SEGURA, F.
2949
SEHGAL, A.K.
2428
SELTZER, D.
2352
SELYE, H.
2848*
SEMANYCZ, J.
2039
SEMENIUK, L.A.
2122
SENDRA LEON, P.
2700
SENN, H.J.
2246
SERAFIN, K.
2485
SERENY, G.
2300
SERNATINGER, E.
2147
SESTOFT, L.
2161
SETHNA, J.R.
2356
SETTI, G.C.
2344*
SEVCENKO, G.
2000
SEWCZ, H.G.
2359
SEWING, K.F.
2105, 2107
SHAFFER, E.A.
2853*
SHAFRIR, E.
2184
SHAH, N.A.
2950
SHAMMA A, M.H.
2277
SHANMUGARATNAM, K.
2791
SHANMUGARATNAM, T.
2605*
SHAPIRO, L.M.
2337
SHARMA, B.N.
2247
SHARMA, M.L.
2068
SHAW, A.E.
2803
SHEIL, A.G.R.
2154
SHERLOCK, P.
2227*
SHERLOCK, S.
2780*, 2823*, 2844
SHERWOOD, W.C.
2830*
SHEVCHENKO, I.S.
2056
SHIMA, I.
2347
SHIN, M.
2302
SHINOZAKI, K.
2854*
SHINYA, H.
2612
SHIODA, R.
2877
SHIRAKURA, T.
2755
SHIRODARIA, C.
2653
SHMERLING, D.H.
2703
SHTEINBERG, G.B.
2217
SHUMSKII, V.I.
2263
SIBAL, R.N.
2467
SIEGEL, H.I.
1976*
SIEGENTHALER, H.
2549
SIEGERS, C.P.
2126*
SIGAM, M.
2550
SIKORA, Z.
2481
SIKOROWA, L.
2903
SILEN, W.
2476, 2936
SILEONI, V.
2887
SILVER, D.
2535, 2862
SILVERBERG, J.W.
2013*
SILVERMAN, N.A.
2734
SIMAVORIAN, P.S.
2723
SIMMONS, R.L.
2619, 2696
SIMON, B.
2108*
SIMON, G.
2005*
SIMON, J.
2084*
SIMON, J.B.
2588*
SIMONS, M.J.
2791

SIMONSEN, J.
2094
SIMONYI, I.
2267
SINGER, A.
2149
SINGH, M.
2113*, 2115*, 2841
SINGH, S.
2745
SINGH, S.D.
2831
SINHA, K.
2372
SINZINGER, H.F.
1987
SIRCUS, W.
2229*, 2678*
SISEL, R.J.
2221
SITNIK, A.P.
2338
SJOEIB, A.A.
2946
SKALEMBA, J.
2554
SKARDOUTSOU, A.
2930
SKATKOV, M.E.
2215
SKILLMAN, J.J.
2476
SKINHOJ, P.
2795
SKINNER, D.B.
2311*
SKIRVING, A.
2231*
SKLAVOUNOU-TSOUROUKTSOGLOU, S.
2923
SKONDRAS, K.
2702
SKURIKHINA, L.A.
2490
SLATER, H.
2901
SLAUNWHITE, W.R., III
2188
SLIWINSKI, M.
2530
SLOAN, R.W.
2870
SLOMIANY, A.
1984
SLOMIANY, B.L.
1984
SMALL, D.M.
2038, 2134*, 2739, 2853*
SMALL, W.P.
2678*
SMALLWOOD, R.A.
2849*
SMIDDY, F.G.
2630
SMIT, J.A.
2156, 2165
SMITH, A.N.
2678*
SMITH, C.L.
2016*, 2017*
SMITH, D.P.
2171
SMITH, G.E.
2206
SMITH, J.A.
2761
SMITH, J.L.
2319
SMITH, L.H.
2575
SMITH, R.B., III
2842, 2889
SMITH, R.L.
2198
SMITH, R.S.
2486
SMITH, S.L.
2617
SMOLSKA, I.
2485
SNIEZYNSKI, C.
2387, 2459
SNOWE, R.J.
2535
SNYDER, C.J.
2908
SOARE, L.
2919
SOARES, E.C.
2724
SOEBERG, R.
2794
SOKOL, A.B.
2375
SOKOLOVA, A.G.
2122
SOLER, F.J.
2856
SOLHEIM, K.
2878
SOLIMAN, L.A.M.
2766
SOLIS, R.T.
2876
SOLTOFT, J.
2794
SOMMERSCHILD, H.C.
2746
SONDERGAARD, E.
2855
SOOD, S.K.
2191
SORENSEN, M.B.
2519
SORGER, K.
2249
SORRELL, M.F.
2813*
SORVIN, G.
2894
SOS, J.
2005*
SOSNIK, H.
2395
SPANOS, P.L.
2438
SPERANZA, V.
2464
SPITZ, L.
2223
SPJUT, H.J.
2707*
SPLITTER, S.D.
2877
SPRINZ, H.
2885*
STADAAS, J.O.
2439, 2440, 2461
STADELMANN, O.
2096
STADIL, F.
2255
STAFFEN, A.
2861
STAHL, E.
2133*
STALDER, G.A.
2671
STAMATOPOULOS, K.
2332
STANLEY, N.N.
2823*, 2829*
STANO, G.
2581*
STARR, T.J.
2786
STAUDACHER, M.
2861
STAVOROVSKY, M.
2551
STEELE, M.
2756
STEFFEN, C.
2123
STEINBERG, L.S.
2510*
STEINER, P.
2218, 2705*
STEMMER, E.A.
2410*, 2631
STEMPIEN, S.J.
2323, 2474
STEPHENSON, D.V., JR.
2351
STEVENS, L.E.
2706*
STEWART, E.T.
2052*
STILL, W.J.
2782*
STOCCHI, F.
2598
STOCK, S.
2869
STOKES, P.L.
2587*
STOKKE, O.
2314*
STRAND, J.
2731*
STRUBELT, O.
2126*
STUBBS, A.J.
2647

STURDEVANT, R.A.L.
2851*
STURM, G.
2241
STUTMAN, L.J.
2776*
STUTZER, H.
2237
SUBIABRE, V.
2944
SUBRASQUET, M.
2111*
SUDHOF, H.
2307
SUGAHARA, K.
2755
SUGANO, H.
2765
SUGIMOTO, H.
2138
SULAHIAN, A.
2886
SULLIVAN, B.H., JR.
2324
SULLIVAN, F.J.
2870
SULLIVAN, L.W.
2505*
SULLIVAN, M.A.
2318
SUNDLER, F.
1971*
SUNSHINE, P.
2601
SURIYAPA, C.
2515
SUSSMAN, T.
2425
SUTANTO, A.H.
2941*
SUTAYAVANICH, S.
2752
SUTHERLAND, D.
2619
SUTHERLAND, D.E.R.
2561
SUTTON, A.L.
2528
SUWANIK, R.
2752
SUZUKI, S.
2304
SVANBORG, A.
2071*
SVORCOVA, V.
2297
SWAN, K.G.
2213*
SYCINSKI, Z.
2547
SZABO, S.
2848*
SZARF, H.
2480
SZAROSZYK, J.
2692
SZEGLI, L.
2919
TACLA, M.
2538
TADA, S.
2302
TAGOR, A.H.
2801
TAKADA, A.
2159
TAKAHASHI, I.
2035
TAKANARI, H.
2567
TAKASHIMA, T.
2302
TAKEDA, M.
2347
TAKESHIGE, K.
2169
TAKEUCHI, A.
2885*
TAKEUCHI, J.
2159
TAMMILEHTO, E.
2032
TAN, K.L.
2403
TANAKA, I.
2347
TANAKA, M.
2304
TANAKA, T.
2195
TANAKA, Y.
2304
TANDON, R.
2015*
TANIGAWA, S.
2304
TANISAWA, A.S.
2074*
TATE, R.C.
2745
TAVERNIER, J.
2394
TAW, J.L.
2733*
TAYLOR, D.S.
2345
TAYLOR, J.D.
2760
TAYLOR, W.F.
2688
TAZZI, A.
2026, 2344*
TEITELBAUM, S.
2539
TEMPLIN, R.
2258
TENNEKOON, G.E.
2376
TEODORI, U.
2650
TEPPERMAN, B.L.
2085*
TERATO, K.
2002*, 2003*
TERBLANCHE, J.
2749
TERENZI, E.
2920
TERNER, A.IA.
1994
TESORIERE, G.
2007*
THAKOR, P.S.
2831
THAYER, W.R., JR.
2289
THEMANN, H.
2153
THEODOROPOULOS, G.
2742
THEORELL, H.
2127*
THIEDEN, H.I.D.
2161
THIEL, H.
2774
THIELE, P.
2380
THIO, R.T.
2377
THIRUMALAI, C.
2447
THOMAS, C.G., JR.
2664
THOMAS, F.B.
2011*
THOMAS, T.V.
2377
THOMPSON, A.G.
2704*
THOMPSON, J.C.
2078*, 2157
THOMPSON, J.H.
2100
THOMPSON, R.P.H.
2768*
THORBJARNARSON, B.
2609*
THORNHILL, T.S.
2882*
THORPE, C.D.
2082*
TIEDEMANN, R.N.
2609*
TILDEN, R.L.
2296
TILSON, M.D.
2560, 2697
TINKER, J.
2465
TISCORNIA, O.
2120
TISHCHENKO, L.D.
2361
TJAIJ, J.K.
2941*
TOBIK, S.
2666
TOCCALINO, H.
2558
TOMASZEWSKI, M.
2163
TOMASZEWSKI, P.
2719

TOMPKINS, R.K.
2348
TORRES, M.F.
2922
TOSCANO, S.
2239
TOULOUKIAN, R.J.
2697
TOURNUT, R.
2709*
TOYE, D.K.M.
2253
TRENGGONOWATI, R.
2895
TRESKE, U.
2421
TRIANDAFILLOU, G.
2455
TRIER, J.S.
2505*
TRUDEAU, W.L.
2412*
TRUELOVE, S.C.
2230*, 2396
TRUINI, F.
2484
TRZECIAK, H.
1997
TSAKALIDIS, D.
2923
TSAREVA, M.
2656
TUCH, A.
2051*
TUCHWEBER, B.
2194
TUCKER, P.C.
2113*
TUMEN, H.
2883*
TUMEN, H.J.
2042*
TURBEY, W.J.
2881*
TURNBERG, L.A.
2753
TURNER, A.C.
2929
TURNER, M.D.
2102, 2104, 2607*
TUROLLA, E.
2248
TYOR, M.P.
2572*
UCHIDA, H.
2220
UEDA, E.
2148
UEDA, M.
2041*
UEDA, T.
2556
UENO, H.
1970*
UHLICH, G.A.
2273
UHRICH, P.C.
2524
ULFOHN, A.
2537
ULVI, H.
2539
URCA, I.
2275, 2628
VACEK, Z.
2000
VALBERG, L.S.
2588*
VALERGAKIS, F.E.G.
2890
VAN BADEN, M.
2660
VAN DER MEER-FIEGGEN, W.
1988
VAN MIERT, A.S.J.P.A.M.
2059
VANAGS, K.
2763
VANDER WEIDE, G.
2820
VANINI, V.
2329
VANKEMMEL, M.
2720
VARCO, R.L.
2025*
VARIERAS, G.
2898
VARMA, H.C.
2892
VATIER, J.
2111*
VELASQUEZ, O.
2715
VENABLE, J.H.
2543
VENABLES, C.W.
2465
VENKATACHALAM, B.
2322
VENTKATESWARAN, P.S.
2441
VERGA, G.
2860
VERNIAEVA, T.I.
2600
VIEGAS DE ANDRADE, S.R.
2053*
VIGNALE, H.
2887
VIKSMAN, M.E.
2200
VIL SHANSKAIA, F.L.
2217
VILLAR, H.
2170
VINCENT, R.
2902
VIOLA, M.R.
2920
VIOLA-MAGNI, M.P.
2197
VIRANUVATTI, V.
2752
VOGEL, C.L.
2732*
VOITA, K.M.
2716
VOLOVOI, V.L.
2600
VOLOZIN, F.Z.
2064
VON BASSEWITZ, D.B.
2153
VON FRITSCH, E.
2241
VON HOFE, E.
2269
VOORHEES, A.B., JR.
2169
VORHEES, C.V.
2124*
VOVOR, V.M.
2748
VOYATZIS, N.
2702
VULOVIC, D.
2523
WADE, A.
2748
WAGENSTEEN, O.H.
2438
WAGLE, A.
2404
WAGNER, H.N., JR.
2234*
WAGNER, W.
2569
WAKASUGI, H.
2035
WALCZAK, P.M.
2875
WALDECK, F.
2065
WALKER, A.R.P.
2604*
WALKER, B.E.
2016*, 2017*
WALKER, W.A.
2018*
WALSH, J.H.
2085*, 2287
WALZ, A.
2421
WANGEL, A.G.
2744
WAPNICK, S.
2591
WARD, A.
2342
WARDEN, G.D.
2706*
WARSHAW, A.L.
2232*, 2698, 2708*
WASASTJERNA, C.
2730*
WASHINGTON, A.
2083*
WASTELL, C.
2465
WASUNNA, A.E.O.
2087*
WATANABE, A.M.
2066

NUMBERS FOLLOWED BY AN ASTERISK INDICATE ABSTRACTS. OTHER NUMBERS REFER TO CITATIONS.

WATERMAN, N.G.
2682
WATNE, A.L.
2542
WATSON, D.W.
2683
WATSON, L.C.
2157
WATTS, J.M.
2849*
WAY, L.W.
2079*
WAYNE, E.R.
2521
WEAVER, D.K.
2676*
WEBB, M.
2174
WEBER, A.
2596
WEBER, B.B.
2856
WEBSTER, J.H.H.
2522
WEBSTER, L.M.
2171
WEBSTER, P.D.
2113*, 2115*
WECHSLER, R.L.
2266
WEIDNER, F.
2579
WEIL, R.
2619
WEINER, S.
2342
WEISBRODT, N.W.
2047*, 2049*, 2050*
WEISS, H.D.
2279
WEITZMAN, J.J.
2624
WELSH, J.D.
1973*
WERTHER, J.W.
2406*
WESSELHOEFT, C.W., JR.
2907
WEST, S.
2147
WESTER, J.
2143
WETTLAUFER, J.N.
2867
WHELDON, J.
2465
WHIMSTER, W.F.
2823*
WHITE, P.
2735
WHITE, T.T.
2709*, 2717
WHITE, W.D.
2278
WHITEHEAD, R.
2230*, 2396
WHITFIELD, W.
2462
WHITNEY, B.
2254, 2850*
WIDDOP, B.
2768*
WIEBE, K.C.
2377
WIECZOREK, J.
2530
WIEGAND, U.
2798
WIELAND, O.
2140
WIENIAWSKI, W.
2158
WIERCINSKI, J.
2395
WIESNER, W.
2279
WILFONG, R.G.
2876
WILLIAMS, J.A.
2465
WILLIAMS, J.S.
2168
WILLIAMS, M.
2558
WILLIAMS, R.
2768*
WILLIAMS, R.J.
2170
WILLIAMS, R.T.
2198
WILLMAN, V.L.
2203*
WILLS, E.D.
2181
WILSON, A.S.
2479
WILSON, B.
2588*
WILSON, D.E.
2083*
WILSON, F.A.
2593
WILSON, J.D.
2740
WILSON, T.S.
2634
WINANS, C.S.
2044*
WINAWER, S.J.
2227*
WINNE, D.
2009*, 2021*
WINNICKI, S.
2369, 2576
WINOKUR, G.L.
2890
WINSHIP, D.H.
2053*
WINTER, M.
2005*
WISHAHI, A.G.
2766
WISHNITZER, T.
2652
WITEK, R.
2554
WITNEY, K.J.
2803
WOLF, E.
2258
WOLFE, B.M.
2203*
WOLFF, H.
2432
WOLFF, W.I.
2612
WOLFRETH, C.C., JR.
2386
WOLLOCH, Y.
2559
WONG, K.P.
2155
WONG, L.T.
2183
WOOD, J.
2829*
WOOD, P.D.
2877
WOODD-WALKER, R.B.
2582*
WOODING, F.B.P.
2135
WOODLEY, J.F.
1973*, 2602
WOODS, J.S.
2193
WOOLER, G.H.
2315*
WORMSLEY, K.G.
2415*, 2475
WOZNIACKI, W.
2531
WRIGHT, H.K.
2560
WYATT, R.G.
2882*
WYNKOOP, B.J.
2879*
WYRWA, E.
2481
YACABUCCI, J.E.
2758
YAGER, J.L.
2012*
YALE, C.E.
2506*
YALOW, R.S.
2084*
YAMADA, Y.
2138
YAMAKAWA, T.
2269, 2349, 2352
YAMAMOTO, T.
2331
YAMAMURA, Y.
1970*, 2148
YAMASHITA, H.
2304
YAMASHITA, S.
2146
YAMAUCHI, J.
2138
YANAGISAWA, T.
2118*

NUMBERS FOLLOWED BY AN ASTERISK INDICATE ABSTRACTS. OTHER NUMBERS REFER TO CITATIONS.

- ABDOMEN
  - PAIN
    - PANCREATITIS, 2721
  - TRAUMA, 2547, 2908

- ABDOMEN, ACUTE
  - ETIOLOGY, 2548
  - MECKELS DIVERTICULUM, 2548
  - SMALL INTESTINE
    - ANOMALY, CONGENITAL, 2548

- ABSCESS
  - LIVER
    - AMEBIASIS, 2750, 2826*, 2944, 2949, 2950
    - INFECTION, BACTERIA, 2769
    - PERITONITIS, 2750
  - PANCREAS, 2698

- ABSORPTION
  - ACID
    - STOMACH, 2406*
  - AMINO ACIDS
    - GASTROENTERITIS, 2582*
    - GLUCOSE, 2028
    - MALNUTRITION, 2582*
  - CALCIUM
    - CHILDREN, 2037
    - DEFICIENCY, 2005*
    - UREMIA, 2032
    - VITAMIN D, 2037
  - ELECTROLYTE
    - CELIAC DISEASE, 2585*
    - SMALL INTESTINE, 2004*
  - GLUCOSE
    - INTESTINE, 2033
    - NEPHRECTOMY, 2033
  - ILEUM
    - BILE ACIDS, 2038
  - INTESTINE
    - CALCIUM, 2032
    - REVIEWS, 2040
    - SUGAR, 2035
    - TECHNIQUES, 2034, 2035
    - TRANSPLANTATION, 2220
  - JEJUNUM
    - AMINO ACIDS, 2019*
    - SUGAR, 2019*
  - LARGE INTESTINE
    - FATTY ACIDS, 2031
    - IRON, 2003*
  - LIPIDS
    - ELECTROLYTE, 2916
  - OMENTUM, 2026
  - PERITONEUM, 2026
  - PEROXIDASE
    - AGE FACTORS, 2018*
  - SMALL INTESTINE
    - AGE FACTORS, 2018*
    - AMINO ACIDS, 2009*, 2028, 2029
    - ATROPINE, 2006*
    - BILE, 2015*
    - BILE ACIDS, 2008*
    - CALCIUM, 2005*
    - CHOLERA, 2013*
    - FATTY ACIDS, 2012*
    - INJURY, 2023*, 2511*
    - IRON, 2002*, 2003*, 2011*
    - KINETICS, 2009*, 2023*
    - LIPIDS, 2015*
    - PHENOBARBITAL, 2011*
    - SUGAR, 2007*, 2039
    - SURGERY, 2039
    - VITAMIN B12, 2014*
  - STOMACH
    - ASPIRIN, 2001*
  - VITAMIN B12
    - SMALL INTESTINE, 2511*, 2597
  - VITAMIN E, 2016*
    - DEFICIENCY, 2017*
    - DIETARY FACTORS, 2017*
  - WATER
    - CELIAC DISEASE, 2585*
    - CIRCULATION, 2021*
    - JEJUNUM, 2021*
  - XYLOSE
    - DIABETES, 2595

- ACHALASIA
  - ESOPHAGUS
    - NEOPLASMS, MALIGNANT, 2335

- ACHLORHYDRIA
  - SEE ALSO ACID SECRETION

- ACID
  - ABSORPTION
    - STOMACH, 2406*

- ACID PHOSPHATASE
  - SEE PHOSPHATASE, ACID

- ACID SECRETION
  - SEE ALSO ACHLORHYDRIA
  - SEE ALSO HYPERCHLORHYDRIA
  - SEE ALSO HYPOCHLORHYDRIA
  - DRUG EFFECTS ON
    - PEPTIC ULCER, 2439
  - IRON
    - DEFICIENCY, 2381
  - PEPTIC ULCER
    - DIAGNOSIS, 2406*
    - DRUG TREATMENT, 2469
    - SURGERY, 2407*, 2409*, 2414*, 2472
  - SMALL INTESTINE
    - SURGERY, 2087*
  - STOMACH
    - AMINO ACIDS, 2101
    - ANTIDEPRESSANTS, 2106
    - ATROPINE, 2082*, 2107
    - BACTERIA, 2075*
    - BILE, 2077*, 2088*
    - BILE ACIDS, 2088*
    - CALCIUM, 2091*
    - 2-DEOXY-D-GLUCOSE, 2107
    - DIAGNOSIS, 2239, 2268
    - DRUG EFFECTS ON, 2429
    - ESOPHAGITIS, REFLUX, 2323
    - FEEDING, 2084*
    - GASTRIN, 2078*, 2091*
    - GLUCAGON, 2083*, 2092, 2097
    - HEARTBURN, 2266
    - HERNIA, HIATUS, 2317
    - HORMONE CONTROL, 2105
    - HORMONE EFFECTS ON, 2079*, 2080*
    - INHIBITION, 2080*, 2093
    - INJURY, 2094
    - INSULIN, 2107

        NERVOUS CONTROL, 2087*
        PENTAGASTRIN, 2104
        PEPTIC ULCER, 2445
        PHYSICAL FACTORS, 2420
        PROSTAGLANDIN, 2098
        SECRETIN, 2104
        TECHNIQUES, 2229*, 2258, 2268, 2278
        VOMITING, 2266
        ZOLLINGER-ELLISON SYNDROME, 2284, 2913

ACIDITY
    DUODENUM
        ION TRANSPORT, 2207
    STOMACH
        MOTILITY, 2415*
        SECRETION, 2207

CIDOSIS
    GASTRIN
        SECRETION, 2210*
    HORMONE
        SECRETION, 2210*

CIDURIA, PYROGLUTAMIC
    HERNIA, HIATUS
        DISEASES ASSOCIATED WITH, 2314*

CYLTRANSFERASE
    LIVER
        ULTRASTRUCTURE, 1980*

DENOSINE TRIPHOSPHATASE
    PANCREAS
        ISOLATION, 2108*
    SMALL INTESTINE
        BILE ACIDS, 2202*
        FATTY ACIDS, 2202*
    STOMACH
        MUCOSA, 2074*

DENOSINE TRIPHOSPHATE
    LIVER
        FATTY LIVER, 2162
    SMALL INTESTINE
        PERFUSION, 2209

DHESIONS
    SIMULATION
        PREVENTION, 2914

DHESIVES
    SEE TISSUE ADHESIVES

DRENERGIC AGENTS
    CARBOHYDRATE
        METABOLISM, 2141
    GALLBLADDER
        MOTILITY, 2058

DRENERGIC BLOCKING AGENTS
    ILEUS
        DRUG TREATMENT, 2066
    PEPTIC ULCER
        STRESS, 2422
    STOMACH
        MOTILITY, 2066

AGE FACTORS
    SEE ALSO CHILDREN, NEONATE
    BILIRUBIN
        METABOLISM, 2155
    CHOLESTEROL
        METABOLISM, 2073
    ESOPHAGITIS, REFLUX
        DRUG TREATMENT, 2316
    ESOPHAGUS
        ULTRASTRUCTURE, 2000
    LACTOSE
        MALABSORPTION, 2594
    LARGE INTESTINE
        BACTERIA, 2216
    LIVER
        MITOSIS, 2196
    PEPTIC ULCER, 2436, 2483
        SURGERY, 2410*, 2450
    PEROXIDASE
        ABSORPTION, 2018*
    PORPHYRIN
        SYNTHESIS, 2193
    SALIVARY GLANDS
        MORPHOLOGY, 2225
    SMALL INTESTINE
        ABSORPTION, 2018*
        LYMPHOCYTE, 1998

AGENESIS
    GALLBLADDER
        CHOLEDOCHOLITHIASIS, 2845*

ALBUMIN
    LIVER
        MORPHOLOGY, 1979*
        PHENOBARBITAL, 2139
        RIBOSOMES, 2195
        SYNTHESIS, 1979*
    SMALL INTESTINE
        MORPHOLOGY, 1977*
        ULTRASTRUCTURE, 1977*
    SYNTHESIS
        LIVER, 2139, 2195

ALCOHOL
    BLOOD
        TECHNIQUES, 2819
    CARBOHYDRATE
        METABOLISM, 2131*
    CIRRHOSIS
        DIETARY FACTORS, 2159
    ESOPHAGUS
        DYSKINESIA, 2053*
        MOTILITY, 2053*
    FATTY LIVER
        DIETARY FACTORS, 2159
        DRUG EFFECTS ON, 2160
    HEPATITIS
        MORPHOLOGY, 2814*
    LIVER
        CHEMICAL COMPOSITION, 1978*
        METABOLISM, 2132*
        MORPHOLOGY, 2126*, 2817
        NUCLEOTIDES, 2180
        ULTRASTRUCTURE, 1978*
    LIVER FUNCTION TESTS, 2126*
    LIVER INJURY, 2191
    METABOLISM
        KINETICS, 2161

- LIVER, 2132*, 2161, 2163, 2178, 2180
- SPECIES DIFFERENCES, 2161
- SMALL INTESTINE
  - MORPHOLOGY, 2505*
- STOMACH
  - PEPSIN SECRETION, 2081*

ALCOHOL DEHYDROGENASE
- LIVER
  - DRUG EFFECTS ON, 2131*
  - ISOENZYMES, 2127*
  - KINETICS, 2177
  - OCCUPATIONAL FACTORS, 2177

ALCOHOLIC LIVER DISEASE
- SEE LIVER DISEASE, ALCOHOLIC

ALKALINE PHOSPHATASE
- SEE PHOSPHATASE, ALKALINE

ALKALOIDS
- LIVER
  - MORPHOLOGY, 2187
  - POTASSIUM, 2190
  - TISSUE CULTURE, 2187

ALKALOSIS
- CONGENITAL
  - DIARRHEA, 2509*
- DEHYDRATION
  - VOMITING, 2915
- GASTRIN
  - SECRETION, 2210*
- HORMONE
  - SECRETION, 2210*

ALLERGY
- PARASITES AND PARASITIC DISEASES, 2958

AMEBIASIS
- ABSCESS
  - LIVER, 2750
- COMPLICATIONS
  - APPENDICITIS, 2956
  - PERITONITIS, 2939*
- DRUG TREATMENT, 2957
- DYSENTERY
  - DRUG TREATMENT, 2941*, 2963
- LARGE INTESTINE
  - RUPTURE, 2939*
- LIVER
  - ABSCESS, 2826*, 2944, 2949, 2950
  - DRUG TREATMENT, 2940*
- RUPTURE
  - LIVER, 2939*

AMINO ACIDS
- ABSORPTION
  - GASTROENTERITIS, 2582*
  - GLUCOSE, 2028
  - MALNUTRITION, 2582*
- HEPATITIS, VIRAL
  - PREGNANCY, 2789
- JEJUNUM
  - ABSORPTION, 2019*
- METABOLISM
  - LIVER, 2240
- SMALL INTESTINE
  - ABSORPTION, 2009*, 2028, 2029
  - MOTILITY, 1986
- STOMACH
  - ACID SECRETION, 2101
  - ENDOCRINE SYSTEM, 1971*
  - MORPHOLOGY, 1971*
  - MOTILITY, 2043*

AMYLASE
- PANCREAS
  - SECRETION, 2115*

AMYLOIDOSIS
- SMALL INTESTINE, 2891

ANALGESICS
- BILIARY TRACT
  - PRESSURE STUDIES, 2149
- LIVER INJURY, 2768*

ANCYLOSTOMIASIS
- GASTROINTESTINAL
  - MORPHOLOGY, 2937

ANEMIA
- HELMINTHIASIS
  - THERAPY, 2952
- HEPATITIS, VIRAL
  - DISEASES ASSOCIATED WITH, 2801
- MECKELS DIVERTICULUM
  - CALCULI, 2513

ANEMIA, PERNICIOUS
- SMALL INTESTINE
  - SURGERY, 2597

ANEMIA, SICKLE CELL
- CHOLELITHIASIS
  - DISEASES ASSOCIATED WITH, 2862

ANESTHESIA
- STOMACH
  - MOTILITY, 2064

ANESTHETICS
- METABOLISM
  - INHIBITION, 2147
  - LIVER, 2147

ANGIOGRAPHY
- BILIARY TRACT
  - CONTRAST MEDIA, 2254
  - DIAGNOSIS, 2250
  - PAIN, 2870
  - TECHNIQUES, 2254
- CHOLELITHIASIS
  - CONTRAST MEDIA, 2228*
- GASTROINTESTINAL
  - BLEEDING, 2275
- HEPATOMEGALY
  - DIAGNOSIS, 2236
- LIVER
  - NEOPLASMS, 2302
- PANCREAS
  - DIAGNOSIS, 2250

ANGIOTENSIN
- SYNTHESIS
  - BILE ACIDS, 2148

- ANOMALY
  - ANORECTUM
    - RADIOLOGY, 2288
    - SURGERY, 2288
  - BILIARY TRACT
    - DISEASES ASSOCIATED WITH, 2528
  - GASTROINTESTINAL
    - GAS, INTESTINAL, 2528
  - LARGE INTESTINE, 2625
    - CIRCULATION, 2669
  - PYLORUS
    - ETIOLOGY, 2350
  - SMALL INTESTINE
    - CHOLECYSTITIS, 2524
  - STOMACH
    - ETIOLOGY, 2363

- ANOMALY, CONGENITAL
  - BILE PIGMENTS
    - METABOLISM, 2731*
  - COLON
    - NERVOUS SYSTEM, 2624
  - DUODENUM
    - COMPRESSION, 2561
  - ESOPHAGUS, 2331
    - FISTULA, 2340
    - SURGERY, 2326, 2330, 2334
  - PANCREAS, 2690, 2697, 2700, 2702
  - PYLORUS, 2403
  - SMALL INTESTINE
    - ABDOMEN, ACUTE, 2548
  - STOMACH
    - SURGERY, 2907

- ANORECTUM
  - ANOMALY
    - RADIOLOGY, 2288
    - SURGERY, 2288

- ANTIBIOTICS
  - SEE ALSO ANTIBACTERIALS, DRUG TREATMENT
  - CANDIDIASIS
    - CHILDREN, 2921
  - DIARRHEA
    - BACTERIA, 2932
  - INTESTINE
    - MICROORGANISMS, 2217
  - WHIPPLES DISEASE
    - IMMUNOLOGY, 2588*

- ANTIBODIES
  - HEPATITIS, VIRAL
    - EPIDEMIOLOGY, 2777*
  - TECHNIQUES
    - CIRRHOSIS, 2270
    - HEPATITIS, 2270, 2294

- ANTICOAGULANTS
  - SMALL INTESTINE
    - HEMATOMA, 2552
  - TRIGLYCERIDE
    - METABOLISM, 2818

- ANTIDEPRESSANTS
  - STOMACH
    - ACID SECRETION, 2106

- ANTIEMETICS
  - LARGE INTESTINE
    - MOTILITY, 2069
  - SMALL INTESTINE
    - MOTILITY, 2070

- ANTIENZYMES
  - RENIN
    - BILE, 1970*
  - SMALL INTESTINE
    - MORPHOLOGY, 1981*

- ANTIGEN, AUSTRALIA
  - CHEMICAL COMPOSITION, 2792
  - CIRRHOSIS, 2779*
  - EPIDEMIOLOGY, 2783*, 2796, 2803
  - ETHNIC FACTORS
    - NEOPLASMS, MALIGNANT, 2791
  - HEPATITIS
    - DIAGNOSIS, 2249
  - HEPATITIS, CHRONIC, 2779*
  - HEPATITIS, SERUM
    - EPIDEMIOLOGY, 2787, 2799
  - HEPATITIS, VIRAL, 2779*, 2781*
    - EPIDEMIOLOGY, 2780*
    - NEONATE, 2778*
  - LIVER
    - NEOPLASMS, MALIGNANT, 2744, 2791
  - PREGNANCY, 2795
  - TECHNIQUES, 2282, 2289, 2291, 2296, 2297
    - CIRRHOSIS, 2270
    - HEPATITIS, 2270, 2294

- ANTIGEN, CARCINOEMBRYONIC
  - COLON
    - NEOPLASMS, MALIGNANT, 2607*

- ANTIINFLAMMATORY AGENTS
  - LIVER
    - LYSOSOMES, 2176
  - PEPTIC ULCER, 2433

- ANTISPASMODICS
  - BILIARY TRACT
    - DYSKINESIA, 2928
  - GASTROINTESTINAL
    - DISEASE, 2928
  - IRRITABLE COLON
    - DRUG TREATMENT, 2610*, 2614

- ANTRECTOMY
  - SEE ALSO GASTRECTOMY
  - SEE ALSO STOMACH, SURGERY
  - DUODENUM
    - ULCER, 2424, 2425

- ANTRUM
  - SEE ALSO STOMACH
  - PYLORUS
    - PEPTIC ULCER, 2473

- ANUS
  - SEE ALSO LARGE INTESTINE
  - FISSURE, 2660
  - REGIONAL ENTERITIS
    - THERAPY, 2643
  - ULCER
    - REGIONAL ENTERITIS, 2579

- AORTA
  - DUODENUM
    - FISTULA, 2522
  - SURGERY
    - COMPLICATIONS, 2629

- APOCRINE GLAND
  - CYSTIC FIBROSIS, 2685*

- APPENDECTOMY
  - SEQUELAE
    - HERNIA, 2670

- APPENDICITIS
  - AMEBIASIS
    - COMPLICATIONS, 2956
  - COMPLICATIONS, 2674
    - CHILDREN, 2661
  - DIAGNOSIS
    - INFECTION, BACTERIA, 2283
  - DIETARY FACTORS
    - FIBER, 2604*
  - DISEASES ASSOCIATED WITH
    - HERNIA, 2659
  - ETIOLOGY
    - SHIGELLOSIS, 2647
  - PERFORATION, 2615
    - PERITONITIS, 2656

- APPENDIX
  - SEE ALSO LARGE INTESTINE
  - CARCINOIDS, 2898
  - LYMPHOCYTE
    - CIRCULATION, 2613
  - MUCUS
    - CYSTS, 2665
  - NEOPLASMS, MALIGNANT
    - METASTASIS, 2628

- ASCARIASIS
  - BILIARY TRACT, 2868
    - CHILDREN, 2959

- ASCITES
  - PANCREATITIS
    - COMPLICATIONS, 2724

- ASPIRIN
  - DRUG METABOLISM
    - BLEEDING, 2837
    - CIRRHOSIS, 2837
  - GASTROINTESTINAL
    - FISTULA, 2507*
  - MALABSORPTION
    - ETIOLOGY, 2583*
    - VITAMIN B12, 2583*
  - STOMACH
    - ABSORPTION, 2001*
    - ION TRANSPORT, 2001*
    - MORPHOLOGY, 1976*
    - PEPSIN SECRETION, 2081*

- ATHEROSCLEROSIS
  - CECUM
    - ISCHEMIA, 2622

- ATRESIA
  - BILIARY TRACT, 2860
    - PHOSPHATASE, ALKALINE, 2852*
  - DUODENUM
    - RADIOLOGY, 2528
  - SMALL INTESTINE
    - ETIOLOGY, 2534

- ATROPINE
  - SMALL INTESTINE
    - ABSORPTION, 2006*
  - STOMACH
    - ACID SECRETION, 2082*, 2107

- AUTORADIOGRAPHY
  - SALIVARY GLANDS
    - MITOSIS, 2215

- BACTERIA
  - BLOOD
    - KWASHIORKOR, 2589
  - DIARRHEA
    - ANTIBIOTICS, 2932
    - CHILDREN, 2932
  - ENTEROCOLITIS
    - ETIOLOGY, 2918
  - INTESTINE
    - STRANGULATION, 2506*
  - LARGE INTESTINE, 2641
    - AGE FACTORS, 2216
  - MALABSORPTION
    - ETIOLOGY, 2581*
  - METABOLISM
    - BILE ACIDS, 2859
  - PEPTIC ULCER
    - ETIOLOGY, 2416*
  - SMALL INTESTINE, 2075*
    - MALABSORPTION, 2581*
    - STASIS SYNDROME, 2580*
    - VILLI, 1989
  - STOMACH
    - ACID SECRETION, 2075*

- BEZOARS
  - SEE FOREIGN BODIES

- BILE
  - BILE ACIDS
    - CHOLECYSTECTOMY, 2853*
    - DRUG EFFECTS ON, 2877
    - METABOLISM, 2859
  - CHEMICAL COMPOSITION, 2158
    - BILE ACIDS, 1970*
    - CIRCULATION, 2166
    - LIVER DISEASE, 2859
    - MUCOPOLYSACCHARIDE, 1982
    - PHENOBARBITAL, 2134*
    - SPECIES DIFFERENCES, 1982
  - CHOLESTEROL
    - CHOLECYSTECTOMY, 2853*
    - CHOLELITHIASIS, 2846*, 2849*
    - DRUG EFFECTS ON, 2877
  - LIPIDS
    - PHENOBARBITAL, 2134*
  - PHOSPHOLIPID
    - PANCREATITIS, 2704*
  - REFLUX
    - STOMACH, 2077*
  - RENIN
    - ANTIENZYMES, 1970*
  - SECRETION
    - CIRCULATION, 2166

- CIRRHOSIS, 2825*
- 2-DEOXY-D-GLUCOSE, 2125*
- ELECTROLYTE, 2198
- GLYCOSIDES, 2143
- INSULIN, 2125*
- MERCURY, 2027
- SECRETIN, 2825*
- SPECIES DIFFERENCES, 2198
- VAGOTOMY, 2125*

- SMALL INTESTINE
  - ABSORPTION, 2015*
- STOMACH
  - ACID SECRETION, 2077*, 2088*

BILE ACIDS
- ANGIOTENSIN
  - SYNTHESIS, 2148
- BACTERIA
  - METABOLISM, 2859
- BILE
  - CHEMICAL COMPOSITION, 1970*
  - CHOLECYSTECTOMY, 2853*
  - DRUG EFFECTS ON, 2877
  - METABOLISM, 2859
- BLOOD
  - LIVER DISEASE, 2854*
- CHOLELITHIASIS
  - DRUG TREATMENT, 2850*
  - ETIOLOGY, 2855
  - PREVENTION, 2855
- CIRCULATION, 2133*
- ILEUM
  - ABSORPTION, 2038
  - SURGERY, 2741
- LIPID
  - SOLUBILITY, 2739
- LIVER
  - SECRETION, 2038
- MALABSORPTION
  - DIAGNOSIS, 2593
  - STEATORRHEA, 2593
  - SURGERY, 2592
- METABOLISM, 2038
  - CROHNS DISEASE, 2572*
  - DRUG EFFECTS ON, 2741
  - HORMONE CONTROL, 2185
  - LIVER, 2133*
- PANCREAS
  - SECRETION, 2120
- PEPTIC ULCER
  - ETIOLOGY, 2411*
- RENIN
  - INHIBITION, 2148
- SMALL INTESTINE
  - ABSORPTION, 2008*
  - ADENOSINE TRIPHOSPHATASE, 2202*
- STEROID
  - METABOLISM, 2740
- STOMACH
  - ACID SECRETION, 2088*
- SYNTHESIS
  - LIVER, 2167
  - PHENOBARBITAL, 2134*
- UREMIA
  - THERAPY, 2008*

BILE DUCT
- COMPRESSION
  - CHOLECYSTITIS, 2872
- CYSTS, 2871
  - NEOPLASMS, MALIGNANT, 2856
- OBSTRUCTION
  - CHOLECYSTOKININ, 2857
  - RADIOLOGY, 2857

BILE PIGMENTS
- METABOLISM
  - ANOMALY, CONGENITAL, 2731*

BILE SALTS
- SEE BILE ACIDS

BILIARY TRACT
- ANGIOGRAPHY
  - CONTRAST MEDIA, 2254
  - PAIN, 2870
  - TECHNIQUES, 2254
- ANOMALY
  - DISEASES ASSOCIATED WITH, 2528
- ASCARIASIS, 2868
  - CHILDREN, 2959
- ATRESIA, 2860
  - PHOSPHATASE, ALKALINE, 2852*
- DIAGNOSIS
  - ANGIOGRAPHY, 2250
- DYSKINESIA
  - ANTISPASMODICS, 2928
  - SIMULATION, 2042*
- FISTULA
  - PARASITES AND PARASITIC DISEASE, 2826*
- LIVER
  - HEPATITIS, CHRONIC, 2805
- MOTILITY
  - ELECTRICAL CONTROL, 2042*
  - PRESSURE STUDIES, 2042*
- NEOPLASMS, BENIGN, 2866
- OBSTRUCTION
  - IMMUNOLOGY, 2804*
  - PEPTIC ULCER, 2876
  - RESPIRATORY SYSTEM, 2137
- PRESSURE STUDIES
  - ANALGESICS, 2149
  - NARCOTICS, 2149
- RADIOLOGY
  - CELIAC DISEASE, 2280
  - CROHNS DISEASE, 2280
  - TECHNIQUES, 2259, 2260
- SURGERY
  - PANCREATITIS, 2713
  - SEQUELAE, 2713

BILIRUBIN
- BLOOD
  - CHOLECYSTECTOMY, 2863
- METABOLISM
  - AGE FACTORS, 2155
  - DRUG EFFECTS ON, 2155
  - HYPERBILIRUBINEMIA, 2129*
- SECRETION
  - INHIBITION, 2130*
  - PLASMA, 2130*

BINDING
- SEE METABOLISM

- BIOFLAVINOIDS
  - FATTY LIVER
    - CHEMICAL COMPOSITION, 2162

- BIOPSY
  - ESOPHAGUS
    - DIAGNOSIS, 2238
  - LIVER, 2261
    - DIAGNOSIS, 2240
    - ENZYMES, 2248
    - HEPATITIS, 2249
    - LIVER DISEASE, 2306
    - NEOPLASMS, MALIGNANT, 2246, 2729*
  - STOMACH
    - DIAGNOSIS, 2242
    - GASTRITIS, 2252

- BLEEDING
  - CIRRHOSIS
    - SURVIVAL, 2836
  - DRUG METABOLISM
    - ASPIRIN, 2837
  - ESOPHAGUS
    - VARICES, 2827*
  - GASTROINTESTINAL
    - ANGIOGRAPHY, 2275
    - HEMANGIOMA, 2537
    - IMMUNOLOGY, 2894
    - NOREPINEPHRINE, 2879*
    - RADIOLOGY, 2253, 2264
    - VASOPRESSIN, 2883*
  - INTESTINE
    - LYMPHANGIECTASIA, 2504*
  - MECKELS DIVERTICULUM
    - CALCULI, 2514
    - SCANNING, SCINTILLATION, 2525
    - ULCER, 2514
  - PANCREATITIS, 2712
    - SURGERY, 2707*
  - PEPTIC ULCER
    - CHILDREN, 2485
    - GASTRECTOMY, 2459
    - PREGNANCY, 2345
  - RECTUM
    - ULCERS, 2667
  - REGIONAL ENTERITIS
    - DUODENUM, 2578
    - LARGE INTESTINE, 2646
  - SMALL INTESTINE
    - DISEASES ASSOCIATED WITH, 2351
  - STOMACH
    - DISEASES ASSOCIATED WITH, 2351
    - DRUG TREATMENT, 2386
  - ULCER
    - CECUM, 2619

- BLOOD
  - ALCOHOL
    - TECHNIQUES, 2819
  - BACTERIA
    - KWASHIORKOR, 2589
  - BILE ACIDS
    - LIVER DISEASE, 2854*
  - BILIRUBIN
    - CHOLECYSTECTOMY, 2863
  - CALCIUM
    - ZOLLINGER-ELLISON SYNDROME, 2881*
  - CHOLESTEROL
    - CIRRHOSIS, 2838
    - DRUG EFFECTS ON, 2741
    - STEROIDS, 2838
  - ENZYMES
    - LIVER INJURY, 2199
  - GASTRIN
    - FEEDING, 2084*, 2085*
    - INSULIN, 2085*
  - GASTROENTERITIS
    - DEHYDRATION, 2895
  - HEPATITIS, VIRAL
    - TRANSMISSION, 2289
  - HORMONE
    - LIVER DISEASE, 2822*
  - LIPIDS
    - LIVER DISEASE, ALCOHOLIC, 2812*
  - MUCOPROTEIN
    - CIRRHOSIS, 2831
    - HEPATITIS, VIRAL, 2831
  - OXYGEN
    - LIVER DISEASE, ALCOHOLIC, 2811*
  - PHOSPHATASE, ALKALINE
    - CHOLECYSTECTOMY, 2863
  - STEROIDS
    - LIVER DISEASE, 2822*

- BLOOD FLOW
  - SEE CIRCULATION

- BLOOD GROUPS
  - STOMACH
    - METAPLASIA, 2396

- BLOOD VOLUME
  - HEPATITIS
    - GALACTOSAMINE, 2774
  - PYLORUS
    - STENOSIS, 2389

- BRADYKININ
  - ILEUM
    - MOTILITY, 2063

- BURNS
  - ESOPHAGUS, 2321
  - LIVER FUNCTION TESTS, 2303
  - STOMACH
    - NEOPLASMS, MALIGNANT, 2376
    - STENOSIS, 2372

- CADMIUM
  - LIVER
    - PREGNANCY, 2174

- CALCIFICATION
  - GALLBLADDER
    - NEOPLASMS, MALIGNANT, 2873

- CALCIUM
  - ABSORPTION
    - CHILDREN, 2037
    - UREMIA, 2032
    - VITAMIN D, 2037
  - BLOOD
    - ZOLLINGER-ELLISON SYNDROME, 2881*
  - DEFICIENCY
    - ABSORPTION, 2005*
  - DUODENUM
    - ION TRANSPORT, 2010*, 2036
  - GASTRIN

    - STIMULATION, 2287
  - ILEUM
    - ION TRANSPORT, 2010*
  - INTESTINE
    - ABSORPTION, 2032
  - ION TRANSPORT
    - STEROID, 2036
  - METABOLISM
    - GASTRECTOMY, 2431
  - PANCREAS
    - ENZYMES, 2123
    - SECRETION, 2123
  - SECRETION
    - STOMACH, 2491
  - SMALL INTESTINE
    - ABSORPTION, 2005*
    - ION TRANSPORT, 2024*
  - STOMACH
    - ACID SECRETION, 2091*
    - MOTILITY, 2057
    - SECRETION, 2086*

- CALCULI
  - MECKELS DIVERTICULUM
    - ANEMIA, 2513
    - BLEEDING, 2514
  - PANCREATIC DUCT
    - SURGERY, 2689

- CANCER
  - SEE NEOPLASMS, MALIGNANT

- CANDIDIASIS
  - CHILDREN
    - ANTIBIOTICS, 2921

- CARBOHYDRATES
  - PANCREAS
    - ENZYMES, 2119

- CARBON TETRACHLORIDE
  - DETOXIFICATION
    - LIVER, 2773
  - LIVER INJURY, 2191
    - DIAGNOSIS, 2199
    - PREVENTION, 2128*

- CARBONIC ANHYDRASE
  - PANCREAS
    - ATROPHY, 2121
  - STOMACH
    - CYCLIC ADENOSINE MONOPHOSPHATE, 2099
    - HISTAMINE, 2099
    - PENTAGASTRIN, 2099

- CARCINOGENESIS
  - LIVER
    - FETOPROTEIN, ALPHA, 2765
    - PREGNANCY, 1995
  - NUCLEIC ACIDS
    - SYNTHESIS, 2172
  - STOMACH
    - INVASION, 2349

- CARCINOIDS
  - APPENDIX, 2898
  - COLON, 2530
  - DUODENUM
    - DISEASES ASSOCIATED WITH, 2567
  - ILEUM, 2530
    - METASTASIS, 2526
  - LARGE INTESTINE, 2529
  - MESENTERY, 2898
  - RECTUM
    - DISEASES ASSOCIATED WITH, 2609*
    - SURGERY, 2609*
  - SMALL INTESTINE
    - DISEASES ASSOCIATED WITH, 2529
    - SEQUELAE, 2564

- CATECHOLAMINES
  - DRUG METABOLISM, 2071*
  - ILEUM
    - MOTILITY, 2063
  - STOMACH
    - PEPSIN SECRETION, 2076*

- CATHARTICS
  - SEE LAXATIVES

- CECUM
  - SEE ALSO LARGE INTESTINE
  - ATHEROSCLEROSIS
    - ISCHEMIA, 2622
  - NECROSIS
    - ISCHEMIA, 2622
  - PERFORATION
    - TRANSFUSION, 2653
  - STENOSIS, 2550
  - TUBERCULOSIS
    - COMPLICATIONS, 2535
  - ULCER
    - BLEEDING, 2619

- CELIAC DISEASE
  - ABSORPTION
    - ELECTROLYTE, 2585*
    - WATER, 2585*
  - BILIARY TRACT
    - RADIOLOGY, 2280
  - DISEASES ASSOCIATED WITH
    - NEOPLASMS, MALIGNANT, 2603
  - ETIOLOGY
    - GENETIC FACTORS, 2587*
  - FAMILIAL FACTORS, 2584*
  - IMMUNOLOGY, 2587*
  - LACTOSE INTOLERANCE
    - DISEASES ASSOCIATED WITH, 2523
  - SMALL INTESTINE
    - PEPTIDASE, 2602

- CHEMICAL COMPOSITION
  - ANTIGEN, AUSTRALIA, 2792
  - BILE, 2158
    - BILE ACIDS, 1970*
    - CIRCULATION, 2166
    - LIVER DISEASE, 2859
    - MUCOPOLYSACCHARIDE, 1982
    - PHENOBARBITAL, 2134*
    - SPECIES DIFFERENCES, 1982
  - CHOLELITHIASIS
    - TRACE ELEMENT, 2858
  - FATTY LIVER
    - BIOFLAVINOIDS, 2162
  - GALLBLADDER
    - TRACE ELEMENT, 2858
  - LIVER

-
  -
    - ALCOHOL, 1978*
  - PANCREAS
    - FEEDING, 2113*
    - PEPTIDES, 2111*
  - STOMACH
    - DIETARY FACTORS, 1985
    - GLYCOLIPIDS, 1984
    - HISTAMINE, 1985
    - PROTEIN, 1985

- CHEMICAL WARFARE AGENTS
  - DIARRHEA
    - ETIOLOGY, 2224

- CHEMOTHERAPY
  - LARGE INTESTINE
    - NEOPLASMS, MALIGNANT, 2893
  - LIVER
    - NEOPLASMS, MALIGNANT, 2606*, 2754
  - PANCREAS
    - NEOPLASMS, MALIGNANT, 2695
  - STOMACH
    - NEOPLASMS, MALIGNANT, 2378

- CHILDREN
  - SEE ALSO NEONATE, AGE FACTORS
  - APPENDICITIS
    - COMPLICATIONS, 2661
  - ASCARIASIS
    - BILIARY TRACT, 2959
  - CALCIUM
    - ABSORPTION, 2037
  - CANDIDIASIS
    - ANTIBIOTICS, 2921
  - CIRRHOSIS, 2821*
    - LIVER FUNCTION TESTS, 2831
    - MALABSORPTION, 2596
  - DIARRHEA
    - BACTERIA, 2932
    - IMMUNOLOGY, 2934
    - SHIGELLOSIS, 2933
  - DUODENUM
    - OBSTRUCTION, 2521
  - HEPATITIS, VIRAL
    - LIVER FUNCTION TESTS, 2831
  - LACTOSE
    - MALABSORPTION, 2594
  - LIVER
    - FIBROSIS, 2746
    - HAMARTOMA, 2745
  - MALABSORPTION
    - REVIEWS, 2601
  - MEGAESOPHAGUS, 2333
  - PARASITES AND PARASITIC DISEASE
    - EPIDEMIOLOGY, 2946
    - LACTASE DEFICIENCY, 2961
  - PEPTIC ULCER, 2480
    - BLEEDING, 2485
  - REGIONAL ENTERITIS, 2576
  - SMALL INTESTINE
    - DISEASE, 2558
    - IMMUNOGLOBULINS, 2508*
  - STOMACH
    - MOTILITY, 2064

- CHLORINATED HYDROCARBONS
  - STOMACH
    - HYPERPLASIA, 2353

- CHOLANGIOGRAPHY
  - SEE ANGIOGRAPHY

- CHOLANGITIS
  - SIMULATION
    - ISOTHIOCYANATE, PHENYLENE, 2848*

- CHOLECYSTECTOMY
  - BILE
    - BILE ACIDS, 2853*
    - CHOLESTEROL, 2853*
  - BLOOD
    - BILIRUBIN, 2863
    - PHOSPHATASE, ALKALINE, 2863
  - SEQUELAE
    - PANCREATITIS, 2865
  - SURVIVAL, 2865

- CHOLECYSTITIS
  - BILE DUCT
    - COMPRESSION, 2872
  - GALLBLADDER
    - MORPHOLOGY, 2864
  - GANGRENE
    - RADIOLOGY, 2874
  - SMALL INTESTINE
    - ANOMALY, 2524

- CHOLECYSTOKININ
  - BILE DUCT
    - OBSTRUCTION, 2857
  - STOMACH
    - SECRETION, 2089*

- CHOLEDOCHOLITHIASIS
  - DIAGNOSIS, 2861
  - GALLBLADDER
    - AGENESIS, 2845*
  - SURGERY, 2861
  - THERAPY, 2867

- CHOLELITHIASIS, 2900
  - ANGIOGRAPHY
    - CONTRAST MEDIA, 2228*
  - BILE
    - CHOLESTEROL, 2846*, 2849*
  - CHEMICAL COMPOSITION
    - TRACE ELEMENT, 2858
  - CHOLESTEROL, 2911
    - METABOLISM, 2136
  - DIETARY FACTORS
    - CHOLESTEROL, 2846*
    - LIPIDS, 2851*
  - DISEASES ASSOCIATED WITH
    - ANEMIA, SICKLE CELL, 2862
  - DRUG TREATMENT, 2869
    - BILE ACIDS, 2850*
  - ETIOLOGY
    - BILE ACIDS, 2855
    - DIETARY FACTORS, 2851*
  - PREVENTION
    - BILE ACIDS, 2855
  - SIMULATION, 2846*

- CHOLERA
  - DIARRHEA
    - DRUG TREATMENT, 2902
  - INTESTINE
    - IMMUNOLOGY, 2888

- SMALL INTESTINE
  - ABSORPTION, 2013*
  - INJURY, 2204*
  - SECRETION, 2013*, 2204*

CHOLESTASIS
- LIVER
  - ENZYMES, 2742
  - MORPHOLOGY, 2182

CHOLESTEROL
- BILE
  - CHOLECYSTECTOMY, 2853*
  - CHOLELITHIASIS, 2846*, 2849*
  - DRUG EFFECTS ON, 2877
- BLOOD
  - CIRRHOSIS, 2838
  - DRUG EFFECTS ON, 2741
  - STEROIDS, 2838
- CHOLELITHIASIS, 2911
  - DIETARY FACTORS, 2846*
- DEFICIENCY
  - SMALL INTESTINE, 1981*
- ILEUM
  - SURGERY, 2025*
- METABOLISM
  - AGE FACTORS, 2073
  - CHOLELITHIASIS, 2136
  - CONSITUTIONAL FACTORS, 2073
  - ILEUM, 2025*
  - LACTATION, 2073
  - LIVER, 2167
  - PREGNANCY, 2073

CHOLINE
- DEFICIENCY
  - CIRRHOSIS, 2159
- LIVER DISEASE, ALCOHOLIC, 1978*

CHYMOTRYSIN
- PANCREAS
  - DIAGNOSIS, 2245

CIRCADIAN RHYTHM
- LIVER
  - METABOLISM, 2144
- OXYGEN
  - METABOLISM, 2144
- SMALL INTESTINE
  - ENZYMES, 2205

CIRCULATION
- BILE
  - CHEMICAL COMPOSITION, 2166
  - SECRETION, 2166
- BILE ACIDS, 2133*
- DUODENUM
  - FISTULA, 2516
  - OBSTRUCTION, 2533
- ESOPHAGUS, 2226
  - MORPHOLOGY, 2219
- HEPATITIS, SERUM
  - COMPLICATIONS, 2793
- HEPATITIS, VIRAL
  - DISEASES ASSOCIATED WITH, 2800
- JEJUNUM
  - DUMPING, 2413*
- LARGE INTESTINE
  - ANOMALY, 2669
- LIVER
  - GASTRIN, 2157
  - LIVER DISEASE, ALCOHOLIC, 2815
  - MORPHOLOGY, 1987, 2222
  - NEOPLASMS, MALIGNANT, 2734, 2752
  - RADIOLOGY, 2263
  - SHOCK, 2213*
  - SHUNT, 2843
  - TECHNIQUES, 2212*, 2251
  - TRANSPLANTATION, 2138
- LYMPH
  - HELMINTHIASIS, 2886
- LYMPHOCYTE
  - APPENDIX, 2613
- OBSTRUCTION
  - LIVER, 2841
- PANCREAS
  - MORPHOLOGY, 2214
  - PANCREATITIS, 2211*
- PANCREATITIS
  - VASOPRESSIN, 2211*
- PEPTIC ULCER
  - DISEASES ASSOCIATED WITH, 2446
- RESPIRATORY SYSTEM
  - CIRRHOSIS, 2829*
- STOMACH
  - GLUCAGON, 2083*
- TECHNIQUES
  - LIVER DISEASE, ALCOHOLIC, 2811*
- WATER
  - ABSORPTION, 2021*

CIRRHOSIS
- ANTIBODIES
  - TECHNIQUES, 2270
- ANTIGEN, AUSTRALIA, 2779*
  - TECHNIQUES, 2270
- BILE
  - SECRETION, 2825*
- BLEEDING
  - SURVIVAL, 2836
- BLOOD
  - CHOLESTEROL, 2838
  - MUCOPROTEIN, 2831
- CARBOHYDRATE
  - METABOLISM, 2840
- CHILDREN, 2821*
  - LIVER FUNCTION TESTS, 2831
  - MALABSORPTION, 2596
- CHOLINE
  - DEFICIENCY, 2159
- DIETARY FACTORS
  - ALCOHOL, 2159
- DISEASES ASSOCIATED WITH
  - DIABETES, 2835
  - HEMOLYSIS, 2830
  - NEOPLASMS, MALIGNANT, 2824*
  - RESPIRATORY SYSTEM, 2824*, 2828*
- DRUG METABOLISM
  - ASPIRIN, 2837
- DRUG TREATMENT, 2833
- ESOPHAGUS
  - VARICES, 2832
- FAMILIAL FACTORS, 2828*
- IMMUNOLOGY, 2834
- LIVER
  - COPPER, 2828*
  - MORPHOLOGY, 2821*
  - ULTRASTRUCTURE, 2828*

- RESPIRATORY SYSTEM
    - CIRCULATION, 2829*
- SHUNT
    - SURGERY, 2844
- VITAMIN B12
    - MALABSORPTION, 2600

CIRRHOSIS, BILIARY
- DIAGNOSIS
    - TECHNIQUES, 2823*
- DISEASES ASSOCIATED WITH
    - SARCOIDOSIS, 2823*

CLOTTING
- LEPTOSPIROSIS
    - LIVER, 2954

COENZYMES
- LIVER
    - LIVER INJURY, 2173
    - STEROIDS, 2173

COLITIS
- SEE ALSO ULCERATIVE COLITIS
- THERAPY, 2650

COLLAGEN DISEASES
- HEPATITIS, CHRONIC
    - DISEASES ASSOCIATED WITH, 2809
- SMALL INTESTINE
    - PERFORATION, 2549

COLON
- SEE ALSO LARGE INTESTINE
- ANOMALY, CONGENITAL
    - NERVOUS SYSTEM, 2624
- CARCINOIDS, 2530
- CYTOLOGY, EXFOLIATIVE
    - TECHNIQUES, 2227*
- DIVERTICULUM
    - DYSPHAGIA, 2633
    - SURGERY, 2658
- FISTULA
    - DISEASES ASSOCIATED WITH, 2569
    - PANCREATITIS, 2727
- GALLBLADDER
    - FISTULA, 2875
- ISCHEMIA
    - SURGERY, 2629
- MOTILITY
    - RADIOLOGY, 2285
- NEOPLASMS
    - REVIEWS, 2640
- NEOPLASMS, MALIGNANT
    - ANTIGEN, CARCINOEMBRYONIC, 2607*
    - ULCERATIVE COLITIS, 2680
- POLYPS
    - FAMILIAL FACTORS, 2632
- SURGERY
    - SEQUELAE, 2632
- TRAUMA
    - SURGERY, 2623

COLOSTOMY
- THERAPY
    - PSYCHOLOGICAL FACTORS, 2652

COMA
- HEPATITIS, VIRAL
    - THERAPY, 2782*

COMPRESSION
- BILE DUCT
    - CHOLECYSTITIS, 2872
- DUODENUM
    - ANOMALY, CONGENITAL, 2561

CONGENITAL
- ALKALOSIS
    - DIARRHEA, 2509*

CONSITUTIONAL FACTORS
- CHOLESTEROL
    - METABOLISM, 2073

CONSTIPATION
- LAXATIVES, 2920
- THERAPY, 2926

CONTRAST MEDIA
- BILIARY TRACT
    - ANGIOGRAPHY, 2254
- CHOLELITHIASIS
    - ANGIOGRAPHY, 2228*
- PANCREAS
    - DIAGNOSIS, 2233*
- PERITONITIS
    - SURVIVAL, 2221

COPPER
- LIVER
    - CIRRHOSIS, 2828*

CORTICOSTEROIDS
- PANCREATITIS
    - ETIOLOGY, 2718

CROHNS DISEASE
- BILE ACIDS
    - METABOLISM, 2572*
- BILIARY TRACT
    - RADIOLOGY, 2280
- LARGE INTESTINE
    - DIAGNOSIS, 2684
    - SURGERY, 2676*
- LIPIDS
    - METABOLISM, 2572*
- REVIEWS, 2683
- STOMACH
    - REVIEWS, 2574
- SURGERY
    - SEQUELAE, 2608*

CRYOTHERAPY
- PEPTIC ULCER, 2438

CYCLIC ADENOSINE MONOPHOSPHATE
- LIVER
    - HEPATECTOMY, 2150
    - HORMONE EFFECTS ON, 2150
- PANCREAS
    - INSULIN, 2072
- STOMACH
    - CARBONIC ANHYDRASE, 2099

CYSTIC FIBROSIS
- APOCRINE GLAND, 2685*
- DISEASES ASSOCIATED WITH

        INFECTION, VIRAL, 2701
    ENZYME
        THERAPY, 2703
    JAUNDICE
        NEONATE, 2688
    LIVER
        SCANNING, SCINTILLATION, 2686*
    LIVER FUNCTION TESTS, 2686*
    PANCREAS
        ENZYMES, 2699

CYSTS
    BILE DUCT, 2871
        NEOPLASMS, MALIGNANT, 2856
    LIVER
        ECHINOCOCCOSIS, 2826*
        RADIOLOGY, 2257
    MUCUS
        APPENDIX, 2665
    PANCREAS
        SURGERY, 2717

CYTOLOGY, EXFOLIATIVE
    COLON
        TECHNIQUES, 2227*
    RECTUM
        TECHNIQUES, 2227*

DEATH
    SEE SURVIVAL

DEFICIENCY
    CALCIUM
        ABSORPTION, 2005*
    CHOLESTEROL
        SMALL INTESTINE, 1981*
    CHOLINE
        CIRRHOSIS, 2159
    FOLIC ACID
        SMALL INTESTINE, 2505*
    IRON
        ACID SECRETION, 2381
    LIVER
        ENZYMES, 2751
    MAGNESIUM
        ION TRANSPORT, 2024*
    PROTEIN
        PANCREAS, 2109*
        STOMACH, 1985
    VITAMIN E
        ABSORPTION, 2017*

DEHYDRATION
    GASTROENTERITIS
        BLOOD, 2895
    VOMITING
        ALKALOSIS, 2915

2-DEOXY-D-GLUCOSE
    BILE
        SECRETION, 2125*
    STOMACH
        ACID SECRETION, 2107

DETOXIFICATION
    CARBON TETRACHLORIDE
        LIVER, 2773
    PHOSPHORUS
        LIVER, 2773

DIABETES
    CIRRHOSIS
        DISEASES ASSOCIATED WITH, 2835
    FATTY LIVER
        DISEASES ASSOCIATED WITH, 2730*
    SECRETION
        INTRINSIC FACTOR, 2398
    STOMACH
        DISEASES ASSOCIATED WITH, 2368
        INTRINSIC FACTOR, 2398
        MOTILITY, 2368
    XYLOSE
        ABSORPTION, 2595

DIAGNOSIS
    APPENDICITIS
        INFECTION, BACTERIA, 2283
    BILE ACIDS
        MALABSORPTION, 2593
    BILIARY TRACT
        ANGIOGRAPHY, 2250
    CHOLEDOCHOLITHIASIS, 2861
    CIRRHOSIS, BILIARY
        TECHNIQUES, 2823*
    CROHNS DISEASE
        LARGE INTESTINE, 2684
    DUODENUM
        ENDOSCOPY, 2262
        RADIOLOGY, 2262
    ESOPHAGITIS, 2313*
        MOTILITY, 2322
    ESOPHAGUS
        BIOPSY, 2238
    GASTRITIS
        ENDOSCOPY, 2230*
    GASTROINTESTINAL
        PERITONEOSCOPY, 2265
    HELMINTHIASIS, 2960
    HEPATITIS
        ANTIGEN, AUSTRALIA, 2249
    HEPATOMEGALY
        ANGIOGRAPHY, 2236
    HERNIA, HIATUS, 2320
    HYPERBILIRUBINEMIA
        NEONATE, 2766
    ILEUM
        RADIOLOGY, 2293
    ILEUS
        RADIOLOGY, 2293
    INFECTIONS, VIRAL
        SEROLOGY, 2299
    JAUNDICE, 2767
        TECHNIQUES, 2231*
    LACTOSE INTOLERANCE
        COMPLICATIONS, 2274
    LAPAROSCOPY, 2273
    LIVER
        BIOPSY, 2240
        ECHOGRAPHY, 2243
        ENZYMES, 2244
    LIVER DISEASE
        GALACTOSE TOLERANCE, 2307
        LIVER FUNCTION TESTS, 2292
        SCANNING, SCINTILLATION, 2292
        XANTHINE OXIDASE, 2277
    LIVER DISEASE, ALCOHOLIC
        SULFOBROMOPHTHALEIN, 2300
    LIVER INJURY
        CARBON TETRACHLORIDE, 2199

- MALABSORPTION
  - DISSACHARIDASE, 2586*
- PANCREAS
  - ANGIOGRAPHY, 2250
  - CHYMOTRYSIN, 2245
  - CONTRAST MEDIA, 2233*
  - ECHOGRAPHY, 2243
  - ENDOSCOPY, 2722
  - LIPASE, 2245
  - TRYPSIN, 2245
- PARASITES AND PARASITIC DISEASE
  - IMMUNOLOGY, 2943
- PEPTIC ULCER
  - ACID SECRETION, 2406*
  - GASTRIN, 2235*
- REGIONAL ENTERITIS, 2577
- STOMACH
  - ACID SECRETION, 2239, 2268
  - BIOPSY, 2242
  - NEOPLASMS, MALIGNANT, 2269
  - PEPSIN SECRETION, 2239
  - SECRETION, 2237
  - TECHNIQUES, 2286
- ULCERATIVE COLITIS, 2684
- ZOLLINGER-ELLISON SYNDROME
  - GASTRIN, 2287

DIALYSIS
- PERITONEUM
  - PANCREATITIS, 2719

DIARRHEA
- ALKALOSIS
  - CONGENITAL, 2509*
- BACTERIA
  - ANTIBIOTICS, 2932
  - CHILDREN, 2932
- DRUG TREATMENT, 2887
  - CHOLERA, 2902
  - PARASITES AND PARASITIC DISEASE, 2948
  - REVIEWS, 2929
  - VAGOTOMY, 2465
- ETIOLOGY
  - CHEMICAL WARFARE AGENTS, 2224
  - NEOPLASMS, 2687
  - PARASITES AND PARASITIC DISEASE, 2948
- FECES
  - CYTOLOGY, 2290
- IMMUNOLOGY
  - CHILDREN, 2934
- LARGE INTESTINE
  - ELECTROPHYSIOLOGY, 2049*
- PANCREAS
  - NEOPLASMS, 2925
- SHIGELLOSIS
  - CHILDREN, 2933

DIETARY FACTORS
- APPENDICITIS
  - FIBER, 2604*
- CHOLELITHIASIS
  - CHOLESTEROL, 2846*
  - ETIOLOGY, 2851*
- CIRRHOSIS
  - ALCOHOL, 2159
- DIVERTICULUM
  - FIBER, 2604*
- FATTY LIVER
  - ALCOHOL, 2159
- GLUCOSE
  - METABOLISM, 2188
- LIPIDS
  - CHOLELITHIASIS, 2851*
- PANCREAS
  - SECRETION, 2109*
- SMALL INTESTINE
  - ION TRANSPORT, 2024*
  - SECRETION, 2203*
- STOMACH
  - CHEMICAL COMPOSITION, 1985
- VITAMIN E
  - ABSORPTION, 2017*

DILATATION
- ILEUM
  - ETIOLOGY, 2556

DISACCHARIDASE
- SEE ALSO LACTASE

DISEASES
- RECTUM, 2635
- STOMACH
  - MITOSIS, 2373

DISEASES ASSOCIATED WITH
- APPENDICITIS
  - HERNIA, 2659
- BILIARY TRACT
  - ANOMALY, 2528
- CARCINOIDS
  - RECTUM, 2609*
- CELIAC DISEASE
  - NEOPLASMS, MALIGNANT, 2603
- CHOLELITHIASIS
  - ANEMIA, SICKLE CELL, 2862
- CIRRHOSIS
  - DIABETES, 2835
  - HEMOLYSIS, 2830
  - NEOPLASMS, MALIGNANT, 2824*
  - RESPIRATORY SYSTEM, 2824*, 2828*
- CIRRHOSIS, BILIARY
  - SARCOIDOSIS, 2823*
- COLON
  - FISTULA, 2569
- CYSTIC FIBROSIS
  - INFECTION, VIRAL, 2701
- DUODENUM
  - CARCINOIDS, 2567
- FATTY LIVER
  - DIABETES, 2730*
- FOREIGN BODIES
  - STOMACH, 2404
- GASTRITIS
  - MUSCULOSKELETAL SYSTEM, 2346
- HELMINTHIASIS
  - RESPIRATORY SYSTEM, 2955
- HEPATITIS
  - IMMUNOLOGY, 2282
- HEPATITIS, CHRONIC
  - COLLAGEN DISEASES, 2809
  - MUSCULOSKELETAL SYSTEM, 2806
- HEPATITIS, VIRAL
  - ANEMIA, 2801
  - CIRCULATION, 2800
  - MUSCULOSKELETAL SYSTEM, 2790

        RETICULOENDOTHELIAL SYSTEM, 2802
    HERNIA, HIATUS
        ACIDURIA, PYROGLUTAMIC, 2314*
        PEPTIC ULCER, 2315*
        RESPIRATORY SYSTEM, 2339
    LACTOSE INTOLERANCE
        CELIAC DISEASE, 2523
        ENTEROCOLITIS, 2523
    LARGE INTESTINE
        ULCERS, 2645
    LIVER DISEASE
        PREGNANCY, 2760
    MECKELS DIVERTICULUM
        PEPTIC ULCER, 2540
    OBESITY
        SHUNTS, INTESTINAL, 2568
    PANCREAS
        NEOPLASMS, BENIGN, 2691
        NEOPLASMS, MALIGNANT, 2691
    PANCREATITIS
        INFECTION, VIRAL, 2726
    PEPTIC ULCER
        CIRCULATION, 2446
        PARATHYROID GLAND, 2491
        UROGENITAL SYSTEM, 2441
    PORPHYRIA, 2710*
    REGIONAL ENTERITIS
        PEPTIC ULCER, 2571*
    SMALL INTESTINE
        BLEEDING, 2351
        CARCINOIDS, 2529
        NEOPLASMS, MALIGNANT, 2557
    STOMACH
        BLEEDING, 2351
        DIABETES, 2368
        NEOPLASMS, MALIGNANT, 2366, 2402
        SYPHILIS, 2361
        ULCER, 2481
    ULCERATIVE COLITIS
        IMMUNOLOGY, 2880*
        NEOPLASMS, MALIGNANT, 2680
    VITAMIN D
        MALABSORPTION, 2599
    ZOLLINGER-ELLISON SYNDROME
        PARATHYROID GLAND, 2881*

DISSACHARIDASE
    MALABSORPTION
        DIAGNOSIS, 2586*
    RECTUM
        MALABSORPTION, 2586*

DIVERTICULUM
    COLON
        DYSPHAGIA, 2633
        SURGERY, 2658
    DIETARY FACTORS
        FIBER, 2604*
    DUODENUM
        SURGERY, 2538
    ESOPHAGUS
        NEOPLASMS, MALIGNANT, 2336
    LARGE INTESTINE
        COMPLICATIONS, 2627

RAINAGE
    LYMPHATICS
        JAUNDICE, OBSTRUCTIVE, 2179
    PERITONITIS, 2910

DRUG EFFECTS ON
    ACID SECRETION
        PEPTIC ULCER, 2439
    ALCOHOL DEHYDROGENASE
        LIVER, 2131*
    BILE
        BILE ACIDS, 2877
        CHOLESTEROL, 2877
    BILE ACIDS
        METABOLISM, 2741
    BILIRUBIN
        METABOLISM, 2155
    BLOOD
        CHOLESTEROL, 2741
    FATTY LIVER
        ALCOHOL, 2160
    INTESTINE
        MORPHOLOGY, 1997
    LIVER
        MITOSIS, 2142
        MORPHOLOGY, 1997
        PHOSPHOLIPID, 2192
    MERCURY
        METABOLISM, 2027
    MOTILITY
        PEPTIC ULCER, 2440
    PANCREAS
        SECRETION, 2115*
    PEPTIC ULCER, 2429
    PROTEIN
        SYNTHESIS, 2175
    SMALL INTESTINE
        ELECTROPHYSIOLOGY, 2045*
        MOTILITY, 2305
    STOMACH
        ACID SECRETION, 2429
        MORPHOLOGY, 1997
        MOTILITY, 2062, 2461
        PERISTALSIS, 2068
        SECRETION, 2355

DRUG METABOLISM
    ASPIRIN
        BLEEDING, 2837
        CIRRHOSIS, 2837
    CATECHOLAMINES, 2071*
    LIVER, 2151, 2175
        IRON, 2181

DRUG TREATMENT
    AMEBIASIS, 2957
        DYSENTERY, 2941*, 2963
        LIVER, 2940*
    CHOLELITHIASIS, 2869
        BILE ACIDS, 2850*
    CIRRHOSIS, 2833
    DIARRHEA, 2887
        CHOLERA, 2902
        PARASITES AND PARASITIC DISEASE, 2948
        REVIEWS, 2929
        VAGOTOMY, 2465
    DUODENUM
        ULCER, 2434
    ESOPHAGITIS, REFLUX
        AGE FACTORS, 2316
    GASTROINTESTINAL
        INFECTION, 2906
    ILEUS, 2554

        ADRENERGIC BLOCKING AGENTS, 2066
    IRRITABLE COLON
        ANTISPASMODICS, 2610*, 2614
        REVIEWS, 2642
    NAUSEA
        REVIEWS, 2929
    PANCREATITIS
        GLUCAGON, 2092
    PEPTIC ULCER, 2421, 2455, 2458, 2468,
      2470
        ACID SECRETION, 2469
        SURGERY, 2430
    STOMACH
        BLEEDING, 2386
    VAGOTOMY
        SEQUELAE, 2489
    VOMITING
        REVIEWS, 2929

DRUGS
    PANCREATITIS
        ETIOLOGY, 2728
    PEPTIC ULCER
        PREVENTION, 2093

DUMPING
    CIRCULATION
        JEJUNUM, 2413*

DUODENUM
    SEE ALSO SMALL INTESTINE
    ANOMALY, CONGENITAL
        COMPRESSION, 2561
    ATRESIA
        RADIOLOGY, 2528
    CARCINOIDS
        DISEASES ASSOCIATED WITH, 2567
    DIAGNOSIS
        ENDOSCOPY, 2262
        RADIOLOGY, 2262
    DIVERTICULUM
        SURGERY, 2538
    ELECTROPHYSIOLOGY
        VOMITING, 2047*
    FISTULA
        AORTA, 2522
        CIRCULATION, 2516
    FOREIGN BODIES
        SURGERY, 2393
    INTUBATION
        TECHNIQUES, 2295
    ION TRANSPORT
        ACIDITY, 2207
        CALCIUM, 2010*, 2036
    NEOPLASMS
        PEPTIC ULCER, 2562
        SURGERY, 2562
    NEOPLASMS, BENIGN, 2359
    OBSTRUCTION
        CHILDREN, 2521
        CIRCULATION, 2533
        ETIOLOGY, 2521, 2702
    REGIONAL ENTERITIS
        BLEEDING, 2578
    RUPTURE
        TRAUMA, 2532
    STENOSIS
        OBSTRUCTION, 2542
    ULCER, 2449
        ANTRECTOMY, 2424, 2425
        DRUG TREATMENT, 2434
        GASTRIN, 2412*
        GLUCOSE TOLERANCE, 2452
        INSULIN, 2452
        MOTILITY, 2415*
        PAIN, 2501
        PERFORATION, 2423
        PYLOROPLASTY, 2424
        SURGERY, 2419, 2426, 2484, 2495,
          2500
        VAGOTOMY, 2425, 2467, 2487

DUODENUM ULCER
    SEE ALSO PEPTIC ULCER

DYSENTERY
    AMEBIASIS
        DRUG TREATMENT, 2941*, 2963
    ETIOLOGY
        SHIGELLOSIS, 2917
    SHIGELLOSIS
        EPIDEMIOLOGY, 2922

DYSKINESIA
    BILIARY TRACT
        ANTISPASMODICS, 2928
        SIMULATION, 2042*
    ESOPHAGUS
        ALCOHOL, 2053*

DYSPEPSIA
    ETIOLOGY, 2931

DYSPHAGIA
    COLON
        DIVERTICULUM, 2633

ECHINOCOCCOSIS
    LIVER
        CYSTS, 2826*

ECHOGRAPHY
    LIVER
        DIAGNOSIS, 2243
    PANCREAS
        DIAGNOSIS, 2243

EDEMA
    SMALL INTESTINE
        OBSTRUCTION, 2518

ELECTRICAL CONTROL
    BILIARY TRACT
        MOTILITY, 2042*

ELECTROLYTE
    ABSORPTION
        CELIAC DISEASE, 2585*
        SMALL INTESTINE, 2004*
    BILE
        SECRETION, 2198
    ESOPHAGUS
        MOTILITY, 2050*
    GASTROINTESTINAL
        DISEASE, 2905
    JEJUNUM
        ION TRANSPORT, 2019*
    LIPIDS

    - ABSORPTION, 2916
  - LIVER
    - MORPHOLOGY, 1994
  - METABOLISM
    - LIVER, 1994
  - SECRETION
    - SMALL INTESTINE, 2004*
  - STOMACH
    - MOTILITY, 2272
    - SECRETION, 2286
  - TRANSPORT
    - ILEUM, 2509*

- LECTROLYTE SECRETION
  - STOMACH
    - GLUCAGON, 2092, 2097

- LECTROPHORESIS
  - STOMACH
    - PROTEASE, 2102

- LECTROPHYSIOLOGY
  - DUODENUM
    - VOMITING, 2047*
  - GALLBLADDER
    - ION TRANSPORT, 2135
  - ILEUM
    - ION TRANSPORT, 2135
  - LARGE INTESTINE
    - DIARRHEA, 2049*
    - FATTY ACIDS, 2054*
    - LAXATIVES, 2054*
    - NERVOUS SYSTEM, 2046*
  - SMALL INTESTINE
    - DRUG EFFECTS ON, 2045*
    - MOTILITY, 2305
    - NERVOUS SYSTEM, 2046*
  - STOMACH
    - SHOCK, 2055*

- MBRYOLOGY
  - ESOPHAGUS
    - ULTRASTRUCTURE, 2000
  - NUCLEIC ACIDS
    - SYNTHESIS, 2172

- MESIS
  - SEE VOMITING

- NDOCRINE SYSTEM
  - STOMACH
    - AMINO ACIDS, 1971*
    - PEPSIN SECRETION, 2076*

- NDOMETRIOSIS
  - ILEUM
    - OBSTRUCTION, 2543
  - RECTUM, 2657

- NDOSCOPY
  - COMPLICATIONS
    - RESPIRATORY SYSTEM, 2256
  - DUODENUM
    - DIAGNOSIS, 2262
  - GASTRITIS
    - DIAGNOSIS, 2230*
  - GASTROINTESTINAL
    - TECHNIQUES, 2281
  - LARGE INTESTINE, 2612
    - POLYPS, 2655
  - PANCREAS
    - DIAGNOSIS, 2722
    - TECHNIQUES, 2279
  - PANCREATIC DUCT, 2233*
    - TECHNIQUES, 2279
  - SIGMOID
    - TECHNIQUES, 2298
  - STOMACH, 2388
    - NEOPLASMS, MALIGNANT, 2383
    - RUPTURE, 2391

- ENTERITIS
  - SEE ALSO REGIONAL ENTERITIS
  - MORPHOLOGY
    - SHIGELLOSIS, 2885*

- ENTEROCOLITIS
  - ETIOLOGY
    - BACTERIA, 2918
  - LACTOSE INTOLERANCE
    - DISEASES ASSOCIATED WITH, 2523

- ENTEROCOLITIS, PSEUDOMEMBRANOUS
  - EPIDEMIOLOGY, 2573

- ENTEROGASTRONE
  - STOMACH
    - SECRETION, 2089*

- ENVIRONMENTAL FACTORS
  - PARASITES AND PARASITIC DISEASE, 2945
  - PEPTIC ULCER
    - EPIDEMIOLOGY, 2488
    - HEALING, 2408*

- ENZYMES
  - BLOOD
    - LIVER INJURY, 2199
  - HEPATITIS, VIRAL
    - LIVER, 2788
  - LIVER, 2146
    - BIOPSY, 2248
    - CHOLESTASIS, 2742
    - DEFICIENCY, 2751
    - DIAGNOSIS, 2244
    - NERVOUS CONTROL, 2122
    - REGENERATION, 2189
  - MICROSOMES
    - LIVER, 2151
  - PANCREAS
    - CALCIUM, 2123
    - CARBOHYDRATES, 2119
    - CYSTIC FIBROSIS, 2699
    - GASTRIN, 2118*
    - ISOLATION, 2112*
    - NERVOUS CONTROL, 2118*, 2122
    - PERFUSION, 2116*
    - SECRETION, 2112*
  - SMALL INTESTINE
    - CIRCADIAN RHYTHM, 2205
    - ISOLATION, 1973*
    - MEMBRANE, 2201*
    - ULTRASTRUCTURE, 2201*
  - THERAPY
    - CYSTIC FIBROSIS, 2703

- EPIDEMIOLOGY
  - ANTIGEN, AUSTRALIA, 2783*, 2796, 2803
  - DYSENTERY
    - SHIGELLOSIS, 2922
  - ENTEROCOLITIS, PSEUDOMEMBRANOUS, 2573
  - GASTROINTESTINAL
    - DISEASE, 2896
  - HELMINTHIASIS, 2962
  - HEPATITIS
    - TOXOPLASMOSIS, 2772
  - HEPATITIS, SERUM
    - ANTIGEN, AUSTRALIA, 2787, 2799
  - HEPATITIS, VIRAL
    - ANTIBODIES, 2777*
    - ANTIGEN, AUSTRALIA, 2780*
  - LARGE INTESTINE
    - NEOPLASMS, MALIGNANT, 2605*
  - LIVER
    - NEOPLASMS, MALIGNANT, 2732*, 2761
  - PARASITES AND PARASITIC DISEASE
    - CHILDREN, 2946
  - PEPTIC ULCER, 2428
    - ENVIRONMENTAL FACTORS, 2488
  - REGIONAL ENTERITIS, 2679*
  - SALMONELLOSIS, 2919
  - STOMACH
    - NEOPLASMS, MALIGNANT, 2379
  - ULCERATIVE COLITIS, 2678*, 2679*

- ERYTHROCYTE
  - INJURY
    - LIVER DISEASE, ALCOHOLIC, 2812*

- ESOPHAGITIS
  - DIAGNOSIS, 2313*
  - MOTILITY
    - DIAGNOSIS, 2322
  - SURGERY, 2313*

- ESOPHAGITIS, REFLUX
  - DRUG TREATMENT
    - AGE FACTORS, 2316
  - MOTILITY, 2325
  - STOMACH
    - ACID SECRETION, 2323
    - MOTILITY, 2048*

- ESOPHAGUS
  - ACHALASIA
    - NEOPLASMS, MALIGNANT, 2335
  - ANOMALY, CONGENITAL, 2331
    - FISTULA, 2340
    - SURGERY, 2326, 2330, 2334
  - BURNS, 2321
  - CIRCULATION, 2226
    - MORPHOLOGY, 2219
  - DIAGNOSIS
    - BIOPSY, 2238
  - DIVERTICULUM
    - NEOPLASMS, MALIGNANT, 2336
  - DYSKINESIA
    - ALCOHOL, 2053*
  - FOREIGN BODIES, 2337
  - MOTILITY
    - ALCOHOL, 2053*
    - ELECTROLYTE, 2050*
    - NERVOUS CONTROL, 2041*, 2051*, 2065
    - PENTAGASTRIN, 2067
    - PEPTIC ULCER, 2503
    - PERISTALSIS, 2050*, 2052*
    - PRESSURE STUDIES, 2044*
    - PROSTAGLANDIN, 2067
    - RADIOLOGY, 2309
    - RESPIRATORY SYSTEM, 2044*, 2052*
    - VAGOTOMY, 2041*
  - NEOPLASMS
    - RADIOLOGY, 2318
  - NEOPLASMS, BENIGN, 2329
  - NEOPLASMS, MALIGNANT
    - RADIOTHERAPY, 2342
    - SURGERY, 2341
  - PEPTIC ULCER, 2432
  - PRESSURE STUDIES
    - TECHNIQUES, 2065
  - RADIOLOGY, 2369
  - REFLUX
    - MOTILITY, 2327
    - RADIOTELEMETRY, 2271
    - SPHINCTER, 2327
  - RUPTURE, 2319
  - STRICTURE, 2324
    - SURGERY, 2311*, 2328
  - SURGERY, 2315*, 2332, 2338
    - SEQUELAE, 2633
  - ULTRASTRUCTURE
    - AGE FACTORS, 2000
    - EMBRYOLOGY, 2000
  - VARICES
    - BLEEDING, 2827*
    - CIRRHOSIS, 2832
    - THERAPY, 2827*

- ETHIONINE
  - PANCREAS
    - SECRETION, 2109*

- ETHNIC FACTORS
  - GALLBLADDER
    - NEOPLASMS, MALIGNANT, 2847*
  - LIVER DISEASE
    - PREGNANCY, 2760
  - NEOPLASMS, MALIGNANT
    - ANTIGEN, AUSTRALIA, 2791
  - PARASITES AND PARASITIC DISEASE, 2945

- FAMILIAL FACTORS
  - CELIAC DISEASE, 2584*
  - CIRRHOSIS, 2828*
  - COLON
    - POLYPS, 2632
  - INTESTINE
    - LYMPHANGIECTASIA, 2504*
  - LARGE INTESTINE
    - VOLVULUS, 2617
  - PORPHYRIA
    - ETIOLOGY, 2731*

- FATS
  - SEE LIPIDS, TRIGLYCERIDES

- FATTY ACIDS
  - LARGE INTESTINE
    - ABSORPTION, 2031
    - ELECTROPHYSIOLOGY, 2054*
    - METABOLISM, 2031, 2208
  - LIVER
    - GLUCONEOGENESIS, 2140

  - SMALL INTESTINE
    - ABSORPTION, 2012*
    - ADENOSINE TRIPHOSPHATASE, 2202*

- FATTY LIVER
  - ALCOHOL
    - DRUG EFFECTS ON, 2160
  - CHEMICAL COMPOSITION
    - BIOFLAVINOIDS, 2162
  - DIETARY FACTORS
    - ALCOHOL, 2159
  - DISEASES ASSOCIATED WITH
    - DIABETES, 2730*
  - LIVER
    - ADENOSINE TRIPHOSPHATE, 2162
    - LIPIDS, 2162
  - TRIGLYCERIDE
    - METABOLISM, 2818

- FECES
  - CYTOLOGY
    - DIARRHEA, 2290

- FETOPROTEIN, ALPHA
  - LIVER
    - CARCINOGENESIS, 2765
    - NEOPLASMS, MALIGNANT, 2743, 2755, 2763, 2765

- FIBROSIS
  - LIVER
    - CHILDREN, 2746

- FISSURE
  - ANUS, 2660

- FISTULA
  - BILIARY TRACT
    - PARASITES AND PARASITIC DISEASE, 2826*
  - COLON
    - DISEASES ASSOCIATED WITH, 2569
    - PANCREATITIS, 2727
  - DUODENUM
    - AORTA, 2522
    - CIRCULATION, 2516
  - ESOPHAGUS
    - ANOMALY, CONGENITAL, 2340
  - GALLBLADDER
    - COLON, 2875
    - STOMACH, 2875
  - GASTROINTESTINAL
    - ASPIRIN, 2507*
  - LARGE INTESTINE
    - SURGERY, 2649
  - SMALL INTESTINE
    - COMPLICATIONS, 2536
    - SURGERY, 2546
    - THERAPY, 2536

- OLIC ACID
  - DEFICIENCY
    - SMALL INTESTINE, 2505*

- OREIGN BODIES
  - DUODENUM
    - SURGERY, 2393
  - ESOPHAGUS, 2337
  - LARGE INTESTINE
    - TRAUMA, 2618
  - PERITONITIS, 2927
    - PARACENTESIS, 2232*
    - STEROIDS, 2884*
  - SMALL INTESTINE
    - PERFORATION, 2553
    - TRAUMA, 2618
  - STOMACH
    - DISEASES ASSOCIATED WITH, 2404
    - SURGERY, 2393

- FUNGUS
  - INFECTION
    - STOMACH, 2385

- GALACTOSAMINE
  - HEPATITIS
    - BLOOD VOLUME, 2774
    - METABOLISM, 2771
  - METABOLISM
    - LIVER, 2771

- GALACTOSE TOLERANCE
  - LIVER DISEASE
    - DIAGNOSIS, 2307

- GALLBLADDER
  - AGENESIS
    - CHOLEDOCHOLITHIASIS, 2845*
  - CHEMICAL COMPOSITION
    - TRACE ELEMENT, 2858
  - FISTULA
    - COLON, 2875
    - STOMACH, 2875
  - ION TRANSPORT
    - ELECTROPHYSIOLOGY, 2135
  - MORPHOLOGY
    - CHOLECYSTITIS, 2864
  - MOTILITY
    - ADRENERGIC AGENTS, 2058
  - NEOPLASMS, MALIGNANT, 2628
    - CALCIFICATION, 2873
    - ETHNIC FACTORS, 2847*
  - TRAUMA, 2878
  - ULTRASTRUCTURE
    - ION TRANSPORT, 2135

- GANGRENE
  - CHOLECYSTITIS
    - RADIOLOGY, 2874

- GAS, INTESTINAL
  - GASTROINTESTINAL
    - ANOMALY, 2528

- GASTRECTOMY
  - SEE ALSO ANTRECTOMY
  - CALCIUM
    - METABOLISM, 2431
  - CARBOHYDRATE
    - METABOLISM, 2347
  - COMPLICATIONS
    - OBSTRUCTION, 2387
  - PEPTIC ULCER
    - BLEEDING, 2459
  - SEQUELAE
    - SURVIVAL, 2380

- GASTRIN

  BLOOD
    FEEDING, 2084*, 2085*
    INSULIN, 2085*
  DUODENUM
    ULCER, 2412*
  LIVER
    CIRCULATION, 2157
  PANCREAS, 2117*
    ENZYMES, 2118*
  PEPTIC ULCER
    DIAGNOSIS, 2235*
  SECRETION
    ACIDOSIS, 2210*
    ALKALOSIS, 2210*
  STIMULATION
    CALCIUM, 2287
  STOMACH
    ACID SECRETION, 2078*, 2091*
    NERVOUS SYSTEM, 2085*
    SECRETION, 2089*, 2090*
  ZOLLINGER-ELLISON SYNDROME, 2255
    DIAGNOSIS, 2287

GASTRITIS
  DIAGNOSIS
    ENDOSCOPY, 2230*
  DISEASES ASSOCIATED WITH
    MUSCULOSKELETAL SYSTEM, 2346
  MORPHOLOGY, 2230*
  SIMULATION, 2095
  STOMACH
    BIOPSY, 2252

GASTROENTERITIS
  AMINO ACIDS
    ABSORPTION, 2582*
  DEHYDRATION
    BLOOD, 2895
  ETIOLOGY
    VIRUS, 2882*
  IMMUNOGLOBULINS
    NEONATE, 2930
  THERAPY
    NEONATE, 2916

GASTROINTESTINAL
  ANOMALY
    GAS, INTESTINAL, 2528
  BLEEDING
    ANGIOGRAPHY, 2275
    HEMANGIOMA, 2537
    IMMUNOLOGY, 2894
    NOREPINEPHRINE, 2879*
    RADIOLOGY, 2253, 2264
    VASOPRESSIN, 2883*
  COMPLICATIONS
    STEROIDS, 2890
  DIAGNOSIS
    PERITONEOSCOPY, 2265
  DISEASE
    ANTISPASMODICS, 2928
    ELECTROLYTE, 2905
    EPIDEMIOLOGY, 2896
  ENDOSCOPY
    TECHNIQUES, 2281
  FISTULA
    ASPIRIN, 2507*
  INFECTION
    DRUG TREATMENT, 2906
  MORPHOLOGY
    ANCYLOSTOMIASIS, 2937
  MUCOSA
    UREMIA, 2519
  OBSTRUCTION
    RADIOLOGY, 2267
  RADIOLOGY
    TECHNIQUES, 2304
  REVIEWS, 2936
  SCLERODERMA, 2924

GENETIC FACTORS
  CELIAC DISEASE
    ETIOLOGY, 2587*

GIARDIASIS
  LIVER, 2951

GLUCAGON
  LIVER
    GLUCONEOGENESIS, 2140
    REGENERATION, 2169
  PANCREATITIS
    DRUG TREATMENT, 2092
  STOMACH
    ACID SECRETION, 2083*, 2092, 2097
    CIRCULATION, 2083*
    ELECTROLYTE SECRETION, 2092, 2097

GLUCONEOGENESIS
  LIVER
    FATTY ACIDS, 2140
    GLUCAGON, 2140

GLUCOSE
  ABSORPTION
    INTESTINE, 2033
    NEPHRECTOMY, 2033
  AMINO ACIDS
    ABSORPTION, 2028
  METABOLISM
    DIETARY FACTORS, 2188
    HORMONE CONTROL, 2188
    LIVER, 2188
    PANCREATITIS, 2728
  TRIGLYCERIDE
    METABOLISM, 2818

GLUCOSE INTOLERANCE
  PEPTIC ULCER
    SURGERY, 2447

GLUCOSE TOLERANCE
  DUODENUM
    ULCER, 2452

GLYCOLIPIDS
  STOMACH
    CHEMICAL COMPOSITION, 1984

GLYCOLYSIS
  SMALL INTESTINE
    PERFUSION, 2209

GLYCOSIDES
  BILE
    SECRETION, 2143
  LIVER
    ULTRASTRUCTURE, 2143

  METABOLISM
    LIVER, 2143
  PLASMA, 2143

GNOTOBIOSIS
  SMALL INTESTINE
    MITOSIS, 1988
    MOTILITY, 1988

HAMARTOMA
  LIVER
    CHILDREN, 2745

HEALING
  PEPTIC ULCER, 2498
    ENVIRONMENTAL FACTORS, 2408*

HEARTBURN
  STOMACH
    ACID SECRETION, 2266

HELMINTHIASIS
  ANEMIA
    THERAPY, 2952
  DIAGNOSIS, 2960
  DISEASES ASSOCIATED WITH
    RESPIRATORY SYSTEM, 2955
  EPIDEMIOLOGY, 2962
  IMMUNOLOGY, 2955
  INTESTINE
    REVIEWS, 2947
  LYMPH
    CIRCULATION, 2886
  TRANSMISSION, 2962

HEMANGIOMA
  GASTROINTESTINAL
    BLEEDING, 2537
  ILEUM, 2537

HEMATOMA
  LIVER
    THERAPY, 2736
  SMALL INTESTINE
    ANTICOAGULANTS, 2552

HEMOLYSIS
  CIRRHOSIS
    DISEASES ASSOCIATED WITH, 2830
  LIVER DISEASE, ALCOHOLIC, 2812*

HEMORRHAGE
  SEE BLEEDING

HEPATECTOMY
  LIVER
    CYCLIC ADENOSINE MONOPHOSPHATE,
      2150
    MITOSIS, 2142
  PEPTIDES
    TOXICITY, 2186

HEPATITIS
  ALCOHOL
    MORPHOLOGY, 2814*
  ANTIBODIES
    TECHNIQUES, 2270, 2294
  ANTIGEN, AUSTRALIA
    TECHNIQUES, 2270, 2294
  DIAGNOSIS
    ANTIGEN, AUSTRALIA, 2249
  DISEASES ASSOCIATED WITH
    IMMUNOLOGY, 2282
  GALACTOSAMINE
    BLOOD VOLUME, 2774
    METABOLISM, 2771
  LIVER
    BIOPSY, 2249
  TOXOPLASMOSIS
    EPIDEMIOLOGY, 2772

HEPATITIS, CHRONIC
  ANTIGEN, AUSTRALIA, 2779*
  DISEASES ASSOCIATED WITH
    COLLAGEN DISEASES, 2809
    MUSCULOSKELETAL SYSTEM, 2806
  ETIOLOGY
    LIPOPROTEIN, 2810
  IMMUNOGLOBULINS
    INFECTION, VIRAL, 2808
  INFECTION, VIRAL
    IMMUNOLOGY, 2807
  LIVER
    BILIARY TRACT, 2805
  VITAMIN B12
    MALABSORPTION, 2600

HEPATITIS, SERUM
  ANTIGEN, AUSTRALIA
    EPIDEMIOLOGY, 2787, 2799
  COMPLICATIONS
    CIRCULATION, 2793

HEPATITIS, VIRAL
  AMINO ACIDS
    PREGNANCY, 2789
  ANTIBODIES
    EPIDEMIOLOGY, 2777*
  ANTIGEN, AUSTRALIA, 2779*, 2781*
    EPIDEMIOLOGY, 2780*
    NEONATE, 2778*
  BLOOD
    MUCOPROTEIN, 2831
  CHILDREN
    LIVER FUNCTION TESTS, 2831
  COMA
    THERAPY, 2782*
  DISEASES ASSOCIATED WITH
    ANEMIA, 2801
    CIRCULATION, 2800
    MUSCULOSKELETAL SYSTEM, 2790
    RETICULOENDOTHELIAL SYSTEM, 2802
  IMMUNOTHERAPY, 2775*, 2776*
  KIDNEY, 2797
  LIVER
    ENZYMES, 2788
  MACROPHAGE, 2786
  OCCUPATIONAL FACTORS, 2784, 2785
  PREVENTION
    TECHNIQUES, 2289
  SMALL INTESTINE
    IMMUNOGLOBULINS, 2794
  SULFOBROMOPHTHALEIN, 2798
  TRANSMISSION
    BLOOD, 2289
    PREVENTION, 2291

HEPATOMEGALY

- DIAGNOSIS
    - ANGIOGRAPHY, 2236

- HERNIA
    - APPENDECTOMY
        - SEQUELAE, 2670
    - APPENDICITIS
        - DISEASES ASSOCIATED WITH, 2659
    - LARGE INTESTINE
        - NEOPLASMS, MALIGNANT, 2631
    - SMALL INTESTINE, 2565

- HERNIA, HIATUS
    - DIAGNOSIS, 2320
    - DISEASES ASSOCIATED WITH
        - ACIDURIA, PYROGLUTAMIC, 2314*
        - PEPTIC ULCER, 2315*
        - RESPIRATORY SYSTEM, 2339
    - ETIOLOGY
        - VOMITING, 2314*
    - STOMACH
        - ACID SECRETION, 2317
        - VOLVULUS, 2375
    - SURGERY, 2315*, 2328, 2343
        - MOTILITY, 2312*
        - REFLUX, 2312*
    - THERAPY, 2320

- HISTAMINE
    - STOMACH
        - CARBONIC ANHYDRASE, 2099
        - CHEMICAL COMPOSITION, 1985
        - SECRETION, 2089*

- HORMONE
    - BLOOD
        - LIVER DISEASE, 2822*
    - SECRETION
        - ACIDOSIS, 2210*
        - ALKALOSIS, 2210*
    - SMALL INTESTINE
        - ION TRANSPORT, 2022*
        - WATER TRANSPORT, 2022*

- HORMONE CONTROL
    - BILE ACIDS
        - METABOLISM, 2185
    - GLUCOSE
        - METABOLISM, 2188
    - STEROID
        - METABOLISM, 2185
    - STEROL
        - METABOLISM, 2185
    - STOMACH
        - ACID SECRETION, 2105

- HORMONE EFFECTS ON
    - LIVER
        - CYCLIC ADENOSINE MONOPHOSPHATE, 2150
    - PANCREAS
        - SECRETION, 2110*
    - STOMACH
        - ACID SECRETION, 2079*, 2080*
        - PEPSIN SECRETION, 2076*
        - SECRETION, 2086*

- HYPERBILIRUBINEMIA
    - BILIRUBIN
        - METABOLISM, 2129*
    - DIAGNOSIS
        - NEONATE, 2766
    - PHOTOTHERAPY, 2124*

- HYPERCHLORHYDRIA
    - SEE ALSO ACID SECRETION

- HYPERPLASIA
    - STOMACH
        - CHLORINATED HYDROCARBONS, 2353

- HYPOCHLORHYDRIA
    - SEE ALSO ACID SECRETION

- ICTERUS
    - SEE JAUNDICE

- ILEOSTOMY
    - THERAPY
        - PSYCHOLOGICAL FACTORS, 2652

- ILEUM
    - SEE ALSO SMALL INTESTINE
    - ABSORPTION
        - BILE ACIDS, 2038
    - CARCINOIDS, 2530
        - METASTASIS, 2526
    - CHOLESTEROL
        - METABOLISM, 2025*
    - DIAGNOSIS
        - RADIOLOGY, 2293
    - DILATATION
        - ETIOLOGY, 2556
    - ELECTROLYTE
        - TRANSPORT, 2509*
    - ENDOMETRIOSIS
        - OBSTRUCTION, 2543
    - HEMANGIOMA, 2537
    - ION TRANSPORT
        - CALCIUM, 2010*
        - ELECTROPHYSIOLOGY, 2135
        - SODIUM, 2020*
    - MOTILITY
        - BRADYKININ, 2063
        - CATECHOLAMINES, 2063
        - NERVOUS CONTROL, 2063
    - OBSTRUCTION, 2624
        - NEOPLASMS, 2539
    - STENOSIS, 2550
    - SURGERY
        - BILE ACIDS, 2741
        - CHOLESTEROL, 2025*
        - MALABSORPTION, 2592
        - SEQUELAE, 2560
    - TUBERCULOSIS
        - COMPLICATIONS, 2535
    - ULTRASTRUCTURE
        - ION TRANSPORT, 2135

- ILEUS
    - COMPLICATIONS, 2570
    - DIAGNOSIS
        - RADIOLOGY, 2293
    - DRUG TREATMENT, 2554
        - ADRENERGIC BLOCKING AGENTS, 2066
    - ETIOLOGY, 2570
        - RADIATION, 2563
    - SURGERY, 2554

- THERAPY, 2904

IMMUNOGLOBULINS
- GASTROENTERITIS
  - NEONATE, 2930
- HEPATITIS, CHRONIC
  - INFECTION, VIRAL, 2808
- REGIONAL ENTERITIS
  - SURGERY, 2677*
- SMALL INTESTINE
  - CHILDREN, 2508*
  - HEPATITIS, VIRAL, 2794
  - SECRETION, 2508*
- STOMACH
  - SECRETION, 2364
- ULCERATIVE COLITIS
  - SURGERY, 2677*

MMUNOLOGY
- BILIARY TRACT
  - OBSTRUCTION, 2804*
- CELIAC DISEASE, 2587*
- CIRRHOSIS, 2834
- DIARRHEA
  - CHILDREN, 2934
- GASTROINTESTINAL
  - BLEEDING, 2894
- HELMINTHIASIS, 2955
- HEPATITIS
  - DISEASES ASSOCIATED WITH, 2282
- INFECTION, VIRAL
  - HEPATITIS, CHRONIC, 2807
- INTESTINE
  - CHOLERA, 2888
- LIVER
  - NEOPLASMS, MALIGNANT, 2732*
  - TRANSPLANTATION, 2156, 2170
- LIVER DISEASE, ALCOHOLIC, 2813*, 2816
- LIVER INJURY
  - TRANSPLANTATION, 2200
- NEOPLASMS, MALIGNANT
  - RECTUM, 2636
- PANCREAS
  - NEOPLASMS, MALIGNANT, 2694
- PARASITES AND PARASITIC DISEASE
  - DIAGNOSIS, 2943
- SMALL INTESTINE
  - NEOPLASMS, 2517
  - TRANSPLANTATION, 1990
- ULCERATIVE COLITIS
  - DISEASES ASSOCIATED WITH, 2880*
- WHIPPLES DISEASE
  - ANTIBIOTICS, 2588*

MUNOSUPPRESSION
- INTESTINE
  - TRANSPLANTATION, 2220
- LIVER
  - TRANSPLANTATION, 2164, 2165

MUNOTHERAPY
- HEPATITIS, VIRAL, 2775*, 2776*

FECTION
- FUNGUS
  - STOMACH, 2385
- GASTROINTESTINAL
  - DRUG TREATMENT, 2906

INFECTION, BACTERIA
- APPENDICITIS
  - DIAGNOSIS, 2283
- LIVER
  - ABSCESS, 2769
- RESPIRATORY SYSTEM
  - LIVER DISEASE, ALCOHOLIC, 2816

INFECTION, VIRAL
- CYSTIC FIBROSIS
  - DISEASES ASSOCIATED WITH, 2701
- HEPATITIS, CHRONIC
  - IMMUNOGLOBULINS, 2808
- IMMUNOLOGY
  - HEPATITIS, CHRONIC, 2807
- PANCREATITIS
  - DISEASES ASSOCIATED WITH, 2726
- SEROLOGY
  - DIAGNOSIS, 2299

INJURY
- ERYTHROCYTE
  - LIVER DISEASE, ALCOHOLIC, 2812*
- SMALL INTESTINE
  - ABSORPTION, 2023*, 2511*
  - CHOLERA, 2204*
- STOMACH
  - ACID SECRETION, 2094
  - MUCOSA, 2103

INSULIN
- BILE
  - SECRETION, 2125*
- BLOOD
  - GASTRIN, 2085*
- DUODENUM
  - ULCER, 2452
- PANCREAS
  - CYCLIC ADENOSINE MONOPHOSPHATE, 2072
- STOMACH
  - ACID SECRETION, 2107

INTESTINE
- SEE ALSO SMALL INTESTINE
- ABSORPTION
  - CALCIUM, 2032
  - REVIEWS, 2040
  - SUGAR, 2035
  - TECHNIQUES, 2034, 2035
- GLUCOSE
  - ABSORPTION, 2033
- HELMINTHIASIS
  - REVIEWS, 2947
- IMMUNOLOGY
  - CHOLERA, 2888
- LYMPHANGIECTASIA
  - BLEEDING, 2504*
  - FAMILIAL FACTORS, 2504*
- MICROORGANISMS
  - ANTIBIOTICS, 2217
  - METABOLISM, 2206
- MORPHOLOGY
  - DRUG EFFECTS ON, 1997
- MOTILITY
  - SURGERY, 2515
- POLYPHENOLS

- METABOLISM, 2206
- SECRETION
  - REVIEWS, 2040
- STRANGULATION
  - BACTERIA, 2506*
- TRANSPLANTATION
  - ABSORPTION, 2220
  - IMMUNOSUPPRESSION, 2220
- TUBERCULOSIS
  - PERFORATION, 2527

- INTRINSIC FACTOR
  - SECRETION
    - DIABETES, 2398
  - STOMACH
    - DIABETES, 2398

- INTUBATION
  - DUODENUM
    - TECHNIQUES, 2295

- ION TRANSFER
  - STOMACH
    - SHOCK, 2055*

- ION TRANSPORT
  - CALCIUM
    - STEROID, 2036
  - DUODENUM
    - ACIDITY, 2207
    - CALCIUM, 2010*, 2036
  - GALLBLADDER
    - ELECTROPHYSIOLOGY, 2135
    - ULTRASTRUCTURE, 2135
  - ILEUM
    - CALCIUM, 2010*
    - ELECTROPHYSIOLOGY, 2135
    - ULTRASTRUCTURE, 2135
  - JEJUNUM
    - ELECTROLYTE, 2019*
  - LIVER
    - TEMPERATURE, 2030
  - MAGNESIUM
    - DEFICIENCY, 2024*
  - SMALL INTESTINE
    - CALCIUM, 2024*
    - DIETARY FACTORS, 2024*
    - HORMONE, 2022*
  - SODIUM
    - ILEUM, 2020*
    - PROSTAGLANDIN, 2020*
  - STOMACH
    - ASPIRIN, 2001*

- IRON
  - DEFICIENCY
    - ACID SECRETION, 2381
  - LARGE INTESTINE
    - ABSORPTION, 2003*
  - LIPIDS
    - METABOLISM, 2181
  - LIVER
    - DRUG METABOLISM, 2181
  - LIVER INJURY, 2191
  - METABOLISM
    - KWASHIORKOR, 2589
  - SMALL INTESTINE
    - ABSORPTION, 2002*, 2003*, 2011*

- IRRITABLE COLON, 2616, 2662
  - DRUG TREATMENT
    - ANTISPASMODICS, 2610*, 2614
    - REVIEWS, 2642
  - PSYCHOLOGICAL FACTORS, 2611*

- ISCHEMIA
  - CECUM
    - ATHEROSCLEROSIS, 2622
    - NECROSIS, 2622
  - COLON
    - SURGERY, 2629
  - MESENTERY, 2889, 2901

- ISOENZYMES
  - LIVER
    - ALCOHOL DEHYDROGENASE, 2127*

- ISOTHIOCYANATE, PHENYLENE
  - CHOLANGITIS
    - SIMULATION, 2848*

- JAUNDICE
  - DIAGNOSIS, 2767
    - TECHNIQUES, 2231*
  - LIVER DISEASE
    - PREGNANCY, 2760
  - NEONATE
    - CYSTIC FIBROSIS, 2688
  - RADIOLOGY
    - TECHNIQUES, 2259
  - SURGERY
    - SEQUELAE, 2767

- JAUNDICE, OBSTRUCTIVE
  - KIDNEY, 2797
  - LYMPHATICS
    - DRAINAGE, 2179
  - NEONATE
    - VITAMIN D, 2852*

- JEJUNUM
  - SEE ALSO SMALL INTESTINE
  - ABSORPTION
    - AMINO ACIDS, 2019*
    - SUGAR, 2019*
  - CIRCULATION
    - DUMPING, 2413*
  - ION TRANSPORT
    - ELECTROLYTE, 2019*
  - WATER
    - ABSORPTION, 2021*

- KINETICS
  - ALCOHOL
    - METABOLISM, 2161
  - LIVER
    - ALCOHOL DEHYDROGENASE, 2177
  - SMALL INTESTINE
    - ABSORPTION, 2009*, 2023*

- KWASHIORKOR
  - BLOOD
    - BACTERIA, 2589
  - IRON
    - METABOLISM, 2589

- LACTASE
  - SEE ALSO DISACCHARIDASE

LACTASE DEFICIENCY
    PARASITES AND PARASITIC DISEASE
        CHILDREN, 2961

LACTATION
    CHOLESTEROL
        METABOLISM, 2073

LACTOSE
    MALABSORPTION
        AGE FACTORS, 2594
        CHILDREN, 2594

LACTOSE INTOLERANCE
    DIAGNOSIS
        COMPLICATIONS, 2274
    DISEASES ASSOCIATED WITH
        CELIAC DISEASE, 2523
        ENTEROCOLITIS, 2523

LAMBLIASIS
    SEE GIARDIASIS

LAPAROSCOPY
    DIAGNOSIS, 2273

LARGE INTESTINE
    SEE ALSO INTESTINE, APPENDIX, CECUM,
        COLON, RECTUM, ANUS, SIGMOID
    ABSORPTION
        FATTY ACIDS, 2031
        IRON, 2003*
    ANOMALY, 2625
    BACTERIA, 2641
        AGE FACTORS, 2216
    CARCINOIDS, 2529
    CIRCULATION
        ANOMALY, 2669
    CROHNS DISEASE
        DIAGNOSIS, 2684
        SURGERY, 2676*
    DIVERTICULUM
        COMPLICATIONS, 2627
    ELECTROPHYSIOLOGY
        DIARRHEA, 2049*
        FATTY ACIDS, 2054*
        LAXATIVES, 2054*
        NERVOUS SYSTEM, 2046*
    ENDOSCOPY, 2612
    FISTULA
        SURGERY, 2649
    METABOLISM
        FATTY ACIDS, 2031, 2208
    METASTASIS
        NEOPLASMS, MALIGNANT, 2606*
    MOTILITY
        ANTIEMETICS, 2069
        FIBER, 2604*
    NEOPLASMS, 2620
        FIBER, 2604*
        SURGERY, 2621
    NEOPLASMS, MALIGNANT, 2648, 2651, 2672
        CHEMOTHERAPY, 2893
        EPIDEMIOLOGY, 2605*
        HERNIA, 2631
        SURGERY, 2654
        SURVIVAL, 2663
    POLYPS
        ENDOSCOPY, 2655
        SURGERY, 2666
    RADIOLOGY
        COMPLICATIONS, 2634
    REGIONAL ENTERITIS
        BLEEDING, 2646
        NEOPLASMS, MALIGNANT, 2639
        RECURRENCE, 2608*
        SURGERY, 2681
        THERAPY, 2671
    RUPTURE
        AMEBIASIS, 2939*
    TRAUMA
        FOREIGN BODIES, 2618
        PHYSICAL FACTORS, 2630
    ULCERS
        DISEASES ASSOCIATED WITH, 2645
    VOLVULUS, 2638
        FAMILIAL FACTORS, 2617

LAXATIVES
    CONSTIPATION, 2920
    LARGE INTESTINE
        ELECTROPHYSIOLOGY, 2054*

LEPTOSPIROSIS
    CLOTTING
        LIVER, 2954
    TRANSMISSION, 2953

LIPASE
    PANCREAS
        DIAGNOSIS, 2245

LIPIDS
    ABSORPTION
        ELECTROLYTE, 2916
    BILE
        PHENOBARBITAL, 2134*
    BLOOD
        LIVER DISEASE, ALCOHOLIC, 2812*
    DIETARY FACTORS
        CHOLELITHIASIS, 2851*
    LIVER
        FATTY LIVER, 2162
        PHENOBARBITAL, 2152
    METABOLISM
        CROHNS DISEASE, 2572*
        IRON, 2181
        LIVER, 2146, 2181, 2184
        LIVER DISEASE, 2737
        PANCREATITIS, 2723
        PREGNANCY, 2184
        SMALL INTESTINE, 2015*
    SOLUBILITY
        BILE ACIDS, 2739
    SMALL INTESTINE
        ABSORPTION, 2015*
    SYNTHESIS
        LIVER, 1980*

LIPOPROTEIN
    HEPATITIS, CHRONIC
        ETIOLOGY, 2810
    METABOLISM
        PANCREATITIS, 2705*

LIVER
- ABSCESS
  - AMEBIASIS, 2750, 2826*, 2944, 2949, 2950
  - INFECTION, BACTERIA, 2769
  - PERITONITIS, 2750
- ADENOSINE TRIPHOSPHATE
  - FATTY LIVER, 2162
- ALBUMIN
  - PHENOBARBITAL, 2139
  - SYNTHESIS, 2139, 2195
- ALCOHOL
  - METABOLISM, 2132*, 2161, 2163, 2178, 2180
- ALCOHOL DEHYDROGENASE
  - DRUG EFFECTS ON, 2131*
  - ISOENZYMES, 2127*
  - KINETICS, 2177
  - OCCUPATIONAL FACTORS, 2177
- AMEBIASIS
  - DRUG TREATMENT, 2940*
  - RUPTURE, 2939*
- AMINO ACIDS
  - METABOLISM, 2240
- ANESTHETICS
  - METABOLISM, 2147
- BILE ACID
  - SYNTHESIS, 2167
- BILE ACIDS
  - METABOLISM, 2133*
- BILIARY TRACT
  - HEPATITIS, CHRONIC, 2805
- BIOPSY, 2261
  - ENZYMES, 2248
  - HEPATITIS, 2249
  - LIVER DISEASE, 2306
- CADMIUM
  - PREGNANCY, 2174
- CARBOHYDRATE
  - METABOLISM, 2131*, 2141, 2183, 2184
- CARBON TETRACHLORIDE
  - DETOXIFICATION, 2773
- CARCINOGENESIS
  - FETOPROTEIN, ALPHA, 2765
  - PREGNANCY, 1995
- CHEMICAL COMPOSITION
  - ALCOHOL, 1978*
- CHOLESTEROL
  - METABOLISM, 2167
- CIRCULATION
  - GASTRIN, 2157
  - LIVER DISEASE, ALCOHOLIC, 2815
  - OBSTRUCTION, 2841
  - RADIOLOGY, 2263
  - SHOCK, 2213*
  - SHUNT, 2843
  - TECHNIQUES, 2212*, 2251
- COENZYMES
  - LIVER INJURY, 2173
  - STEROIDS, 2173
- COPPER
  - CIRRHOSIS, 2828*
- CYCLIC ADENOSINE MONOPHOSPHATE
  - HEPATECTOMY, 2150
  - HORMONE EFFECTS ON, 2150
- CYSTS
  - ECHINOCOCCOSIS, 2826*
  - RADIOLOGY, 2257
- DIAGNOSIS
  - BIOPSY, 2240
  - ECHOGRAPHY, 2243
  - ENZYMES, 2244
- DRUG METABOLISM, 2151, 2175
  - IRON, 2181
- ELECTROLYTE
  - METABOLISM, 1994
- ENZYMES, 2146
  - CHOLESTASIS, 2742
  - DEFICIENCY, 2751
  - NERVOUS CONTROL, 2122
- FIBROSIS
  - CHILDREN, 2746
- GALACTOSAMINE
  - METABOLISM, 2771
- GIARDIASIS, 2951
- GLUCONEOGENESIS
  - FATTY ACIDS, 2140
  - GLUCAGON, 2140
- GLUCOSE
  - METABOLISM, 2188
- GLYCOSIDES
  - METABOLISM, 2143
- HAMARTOMA
  - CHILDREN, 2745
- HEMATOMA
  - THERAPY, 2736
- HEPATITIS, VIRAL
  - ENZYMES, 2788
- ION TRANSPORT
  - TEMPERATURE, 2030
- LEPTOSPIROSIS
  - CLOTTING, 2954
- LIPID
  - METABOLISM, 2146
- LIPIDS
  - FATTY LIVER, 2162
  - METABOLISM, 2181, 2184
  - PHENOBARBITAL, 2152
  - SYNTHESIS, 1980*
- LYSOSOMES
  - ANTIINFLAMMATORY AGENTS, 2176
  - STEROIDS, 2176
- MEMBRANE
  - ISOLATION, 1992
- METABOLISM
  - ALCOHOL, 2132*
  - CIRCADIAN RHYTHM, 2144
- METASTASIS
  - LIVER FUNCTION TESTS, 2694
- MICROSOMES
  - ENZYMES, 2151
- MITOSIS
  - AGE FACTORS, 2196
  - DRUG EFFECTS ON, 2142
  - HEPATECTOMY, 2142
- MORPHOLOGY
  - ALBUMIN, 1979*
  - ALCOHOL, 2126*, 2817
  - ALKALOIDS, 2187
  - CHOLESTASIS, 2182
  - CIRCULATION, 1987, 2222
  - CIRRHOSIS, 2821*
  - DRUG EFFECTS ON, 1997
  - ELECTROLYTE, 1994
  - LIVER DISEASE, ALCOHOLIC, 2820
  - NEOPLASMS, MALIGNANT, 1995
- MYCOSIS FUNGOIDES, 2770

NEOPLASMS
    ANGIOGRAPHY, 2302
NEOPLASMS, BENIGN, 2738
NEOPLASMS, MALIGNANT, 2738, 2762
    ANTIGEN, AUSTRALIA, 2744, 2791
    BIOPSY, 2246, 2729*
    CHEMOTHERAPY, 2606*, 2754
    CIRCULATION, 2734, 2752
    EPIDEMIOLOGY, 2732*, 2761
    FETOPROTEIN, ALPHA, 2743, 2755,
      2763, 2765
    IMMUNOLOGY, 2732*
    METASTASIS, 2748, 2758
    PERITONEOSCOPY, 2729*
    RUPTURE, 2733*
    SCANNING, SCINTILLATION, 2234*,
      2247
    SURGERY, 2759
NUCLEIC ACIDS
    METABOLISM, 2189, 2197
    SYNTHESIS, 2197
NUCLEOTIDES
    ALCOHOL, 2180
PERFUSION
    TECHNIQUES, 2145
PHOSPHATASE, ACID
    SHOCK, 2168
PHOSPHOLIPID
    DRUG EFFECTS ON, 2192
PHOSPHORUS
    DETOXIFICATION, 2773
POTASSIUM
    ALKALOIDS, 2190
PROTEIN
    SYNTHESIS, 2175
REGENERATION
    ENZYMES, 2189
    GLUCAGON, 2169
RIBOSOMES
    ALBUMIN, 2195
SCANNING, SCINTILLATION
    CYSTIC FIBROSIS, 2686*
SCHISTOSOMIASIS
    PANCREAS FUNCTION TESTS, 2942
SECRETION
    BILE ACIDS, 2038
SHUNT
    SURGERY, 2839
SYNTHESIS
    ALBUMIN, 1979*
TISSUE CULTURE
    ALKALOIDS, 2187
TRANSPLANTATION, 2153
    CIRCULATION, 2138
    IMMUNOLOGY, 2156, 2170
    IMMUNOSUPPRESSION, 2164, 2165
    LIVER INJURY, 2164
    PERFUSION, 2171
    REVIEWS, 2749
    SHUNT, 2164
    TECHNIQUES, 2154
    TEMPERATURE, 2138
TRAUMA
    SURGERY, 2735, 2747, 2756, 2757,
      2839
ULTRASTRUCTURE, 1993
    ACYLTRANSFERASE, 1980*
    ALCOHOL, 1978*
    CIRRHOSIS, 2828*
        GLYCOSIDES, 2143
        LIVER DISEASE, ALCOHOLIC, 2820
        PREGNANCY, 2194
        REJECTION, 2153
        STEROIDS, 2194

LIVER DISEASE
    BILE
        CHEMICAL COMPOSITION, 2859
    BLOOD
        BILE ACIDS, 2854*
        HORMONE, 2822*
        STEROIDS, 2822*
    DIAGNOSIS
        GALACTOSE TOLERANCE, 2307
        LIVER FUNCTION TESTS, 2292
        SCANNING, SCINTILLATION, 2292
        XANTHINE OXIDASE, 2277
    LIPID
        METABOLISM, 2737
    LIVER
        BIOPSY, 2306
    PREGNANCY
        DISEASES ASSOCIATED WITH, 2760
        ETHNIC FACTORS, 2760
        JAUNDICE, 2760
    SEDATIVES
        METABOLISM, 2753
    SURGERY, 2764

LIVER DISEASE, ALCOHOLIC
    BLOOD
        LIPIDS, 2812*
        OXYGEN, 2811*
    CHOLINE, 1978*
    CIRCULATION
        TECHNIQUES, 2811*
    DIAGNOSIS
        SULFOBROMOPHTHALEIN, 2300
    ERYTHROCYTE
        INJURY, 2812*
    HEMOLYSIS, 2812*
    IMMUNOLOGY, 2813*, 2816
    LIVER
        CIRCULATION, 2815
        MORPHOLOGY, 2820
        ULTRASTRUCTURE, 2820
    MITOCHONDRIA, 2132*
    RESPIRATORY SYSTEM
        INFECTION, BACTERIA, 2816

LIVER FUNCTION TESTS, 2310
    ALCOHOL, 2126*
    BURNS, 2303
    CIRRHOSIS
        CHILDREN, 2831
    CYSTIC FIBROSIS, 2686*
    HEPATITIS, VIRAL
        CHILDREN, 2831
    LIVER
        METASTASIS, 2694
    LIVER DISEASE
        DIAGNOSIS, 2292

LIVER INJURY
    ALCOHOL, 2191
    ANALGESICS, 2768*

  - BLOOD
    - ENZYMES, 2199
  - CARBON TETRACHLORIDE, 2191
    - DIAGNOSIS, 2199
    - PREVENTION, 2128*
  - IRON, 2191
  - LIVER
    - COENZYMES, 2173
    - TRANSPLANTATION, 2164
  - PREVENTION
    - CARBON TETRACHLORIDE, 2128*
  - TRANSPLANTATION
    - IMMUNOLOGY, 2200

- LYMPH
  - CIRCULATION
    - HELMINTHIASIS, 2886

- LYMPHANGIECTASIA
  - INTESTINE
    - BLEEDING, 2504*
    - FAMILIAL FACTORS, 2504*

- LYMPHATICS
  - DRAINAGE
    - JAUNDICE, OBSTRUCTIVE, 2179
  - STOMACH
    - NEOPLASMS, MALIGNANT, 2344*

- LYMPHOCYTE
  - CIRCULATION
    - APPENDIX, 2613
  - NUCLEIC ACIDS
    - SYNTHESIS, 1999
  - SMALL INTESTINE, 1999
    - AGE FACTORS, 1998

- LYSOSOMES
  - LIVER
    - ANTIINFLAMMATORY AGENTS, 2176
    - STEROIDS, 2176

- MACROPHAGE
  - HEPATITIS, VIRAL, 2786

- MAGNESIUM
  - DEFICIENCY
    - ION TRANSPORT, 2024*

- MALABSORPTION
  - BILE ACIDS
    - DIAGNOSIS, 2593
    - STEATORRHEA, 2593
    - SURGERY, 2592
  - CHILDREN
    - REVIEWS, 2601
  - CIRRHOSIS
    - CHILDREN, 2596
  - DIAGNOSIS
    - DISSACHARIDASE, 2586*
  - ETIOLOGY, 2590
    - ASPIRIN, 2583*
    - BACTERIA, 2581*
  - ILEUM
    - SURGERY, 2592
  - LACTOSE
    - AGE FACTORS, 2594
    - CHILDREN, 2594
  - RECTUM
    - DISSACHARIDASE, 2586*
  - REVIEWS, 2598
  - SMALL INTESTINE
    - BACTERIA, 2581*
    - NEOPLASMS, MALIGNANT, 2544
    - SURGERY, 2591
  - VITAMIN B12
    - ASPIRIN, 2583*
    - CIRRHOSIS, 2600
    - HEPATITIS, CHRONIC, 2600
  - VITAMIN D
    - DISEASES ASSOCIATED WITH, 2599

- MALIGNANT
  - SEE NEOPLASMS, MALIGNANT

- MALNUTRITION
  - AMINO ACIDS
    - ABSORPTION, 2582*

- MANOMETRY
  - SEE PRESSURE STUDIES

- MECKELS DIVERTICULUM
  - ABDOMEN, ACUTE, 2548
  - BLEEDING
    - SCANNING, SCINTILLATION, 2525
  - CALCULI
    - ANEMIA, 2513
    - BLEEDING, 2514
  - COMPLICATIONS, 2540, 2541
  - DISEASES ASSOCIATED WITH
    - PEPTIC ULCER, 2540
  - PERFORATION, 2531
    - COMPLICATIONS, 2569
  - ULCER
    - BLEEDING, 2514

- MEGACOLON
  - ETIOLOGY
    - TRYPANOSOMIASIS, 2644
  - SURGERY
    - TECHNIQUES, 2644
  - ULCERATIVE COLITIS
    - SEQUELAE, 2682

- MEGAESOPHAGUS
  - CHILDREN, 2333

- MEMBRANE
  - LIVER
    - ISOLATION, 1992
  - SMALL INTESTINE
    - ENZYMES, 2201*
    - ISOLATION, 1973*

- MENETRIERS DISEASE, 2384
  - REVIEWS, 2390

- MERCURY
  - BILE
    - SECRETION, 2027
  - METABOLISM
    - DRUG EFFECTS ON, 2027

- MESENTERY
  - CARCINOIDS, 2898
  - ISCHEMIA, 2889, 2901
  - NEOPLASMS, BENIGN, 2632

- METABOLISM
  - ALCOHOL
    - KINETICS, 2161
    - LIVER, 2132*, 2161, 2163, 2178, 2180
    - SPECIES DIFFERENCES, 2161
  - AMINO ACIDS
    - LIVER, 2240
  - ANESTHETICS
    - INHIBITION, 2147
    - LIVER, 2147
  - BACTERIA
    - BILE ACIDS, 2859
  - BILE
    - BILE ACIDS, 2859
  - BILE ACIDS, 2038
    - CROHNS DISEASE, 2572*
    - DRUG EFFECTS ON, 2741
    - HORMONE CONTROL, 2185
    - LIVER, 2133*
  - BILE PIGMENTS
    - ANOMALY, CONGENITAL, 2731*
  - BILIRUBIN
    - AGE FACTORS, 2155
    - DRUG EFFECTS ON, 2155
    - HYPERBILIRUBINEMIA, 2129*
  - CALCIUM
    - GASTRECTOMY, 2431
  - CARBOHYDRATE
    - ADRENERGIC AGENTS, 2141
    - ALCOHOL, 2131*
    - CIRRHOSIS, 2840
    - GASTRECTOMY, 2347
    - LIVER, 2131*, 2141, 2183, 2184
    - PHENOLS, 2183
    - PREGNANCY, 2184
  - CHOLESTEROL
    - AGE FACTORS, 2073
    - CHOLELITHIASIS, 2136
    - CONSITUTIONAL FACTORS, 2073
    - ILEUM, 2025*
    - LACTATION, 2073
    - LIVER, 2167
    - PREGNANCY, 2073
  - ELECTROLYTE
    - LIVER, 1994
  - GALACTOSAMINE
    - LIVER, 2771
  - GLUCOSE
    - DIETARY FACTORS, 2188
    - HORMONE CONTROL, 2188
    - LIVER, 2188
    - PANCREATITIS, 2728
  - GLYCOSIDES
    - LIVER, 2143
  - HEPATITIS
    - GALACTOSAMINE, 2771
  - INTESTINE
    - MICROORGANISMS, 2206
  - IRON
    - KWASHIORKOR, 2589
  - LARGE INTESTINE
    - FATTY ACIDS, 2031, 2208
  - LIPID
    - LIVER, 2146
    - LIVER DISEASE, 2737
    - PANCREATITIS, 2723
  - LIPIDS
    - CROHNS DISEASE, 2572*
    - IRON, 2181
    - LIVER, 2181, 2184
    - PREGNANCY, 2184
    - SMALL INTESTINE, 2015*
  - LIPOPROTEIN
    - PANCREATITIS, 2705*
  - LIVER
    - ALCOHOL, 2132*
    - CIRCADIAN RHYTHM, 2144
  - MERCURY
    - DRUG EFFECTS ON, 2027
  - NUCLEIC ACIDS
    - LIVER, 2189, 2197
  - OXYGEN
    - CIRCADIAN RHYTHM, 2144
  - POLYPHENOLS
    - INTESTINE, 2206
  - SEDATIVES
    - LIVER DISEASE, 2753
  - SMALL INTESTINE
    - TRANSFUSION, 2512
  - STEROID
    - BILE ACIDS, 2740
    - HORMONE CONTROL, 2185
  - STEROL
    - HORMONE CONTROL, 2185
  - TRIGLYCERIDE
    - ANTICOAGULANTS, 2818
    - FATTY LIVER, 2818
    - GLUCOSE, 2818

- METAPLASIA
  - STOMACH
    - BLOOD GROUPS, 2396

- MICROORGANISMS
  - INTESTINE
    - ANTIBIOTICS, 2217
    - METABOLISM, 2206

- MICROSOMES
  - ENZYMES
    - LIVER, 2151

- MITOCHONDRIA
  - LIVER DISEASE, ALCOHOLIC, 2132*

- MITOSIS
  - LIVER
    - AGE FACTORS, 2196
    - DRUG EFFECTS ON, 2142
    - HEPATECTOMY, 2142
  - SALIVARY GLANDS
    - AUTORADIOGRAPHY, 2215
  - SMALL INTESTINE
    - GNOTOBIOSIS, 1988
    - RADIATION, 1988
  - STOMACH
    - DISEASES, 2373

- MORTALITY
  - SEE SURVIVAL

- MOTILITY
  - BILIARY TRACT
    - ELECTRICAL CONTROL, 2042*
    - PRESSURE STUDIES, 2042*
  - COLON
    - RADIOLOGY, 2285

  DRUG EFFECTS ON
    PEPTIC ULCER, 2440
  DUODENUM
    ULCER, 2415*
  ESOPHAGITIS
    DIAGNOSIS, 2322
  ESOPHAGITIS, REFLUX, 2325
  ESOPHAGUS
    ALCOHOL, 2053*
    ELECTROLYTE, 2050*
    NERVOUS CONTROL, 2041*, 2051*, 2065
    PENTAGASTRIN, 2067
    PEPTIC ULCER, 2503
    PERISTALSIS, 2050*, 2052*
    PRESSURE STUDIES, 2044*
    PROSTAGLANDIN, 2067
    RADIOLOGY, 2309
    REFLUX, 2327
    RESPIRATORY SYSTEM, 2044*, 2052*
    VAGOTOMY, 2041*
  GALLBLADDER
    ADRENERGIC AGENTS, 2058
  HERNIA, HIATUS
    SURGERY, 2312*
  ILEUM
    BRADYKININ, 2063
    CATECHOLAMINES, 2063
    NERVOUS CONTROL, 2063
  INTESTINE
    SURGERY, 2515
  LARGE INTESTINE
    ANTIEMETICS, 2069
    FIBER, 2604*
  SMALL INTESTINE
    AMINO ACIDS, 1986
    ANTIEMETICS, 2070
    DRUG EFFECTS ON, 2305
    ELECTROPHYSIOLOGY, 2305
    GNOTOBIOSIS, 1988
    NERVOUS SYSTEM, 2060
    RADIATION, 1988
    RADIOLOGY, 2285
    REVIEWS, 2061
    SURGERY, 2060
  STOMACH
    ACIDITY, 2415*
    ADRENERGIC BLOCKING AGENTS, 2066
    AMINO ACIDS, 2043*
    ANESTHESIA, 2064
    CALCIUM, 2057
    CHILDREN, 2064
    DIABETES, 2368
    DRUG EFFECTS ON, 2062, 2461
    ELECTROLYTE, 2272
    ESOPHAGITIS, REFLUX, 2048*
    INHIBITION, 2095
    NERVOUS SYSTEM, 1996
    PRESSURE STUDIES, 2048*
    RADIOLOGY, 2272
    RADIOTELEMETRY, 2056
    SODIUM, 2057
    SURGERY, 2066

MUCOPOLYSACCHARIDE
  BILE
    CHEMICAL COMPOSITION, 1982

MUCOPROTEIN
  BLOOD
    CIRRHOSIS, 2831
    HEPATITIS, VIRAL, 2831

MUCOSA
  GASTROINTESTINAL
    UREMIA, 2519
  STOMACH
    ADENOSINE TRIPHOSPHATASE, 2074*
    INJURY, 2103

MUCUS
  CYSTS
    APPENDIX, 2665
  STOMACH
    PHYSICAL PROPERTIES, 1972*

MUD THERAPY
  PEPTIC ULCER, 2456

MUSCULOSKELETAL SYSTEM
  GASTRITIS
    DISEASES ASSOCIATED WITH, 2346
  HEPATITIS, CHRONIC
    DISEASES ASSOCIATED WITH, 2806
  HEPATITIS, VIRAL
    DISEASES ASSOCIATED WITH, 2790

MYCOSIS
  SEE FUNGUS DISEASE

MYCOSIS FUNGOIDES
  LIVER, 2770

NARCOTICS
  BILIARY TRACT
    PRESSURE STUDIES, 2149

NAUSEA
  DRUG TREATMENT
    REVIEWS, 2929

NECROSIS
  CECUM
    ISCHEMIA, 2622
  PANCREAS
    PREGNANCY, 2716

NEONATE
  SEE ALSO AGE FACTORS, CHILDREN
  GASTROENTERITIS
    IMMUNOGLOBULINS, 2930
    THERAPY, 2916
  HEPATITIS, VIRAL
    ANTIGEN, AUSTRALIA, 2778*
  HYPERBILIRUBINEMIA
    DIAGNOSIS, 2766
  JAUNDICE
    CYSTIC FIBROSIS, 2688
  JAUNDICE, OBSTRUCTIVE
    VITAMIN D, 2852*
  NUCLEIC ACIDS
    SYNTHESIS, 2197
  PYLORUS
    STENOSIS, 2382

NEOPLASMS
  COLON
    REVIEWS, 2640

    DIARRHEA
        ETIOLOGY, 2687
    DUODENUM
        PEPTIC ULCER, 2562
        SURGERY, 2562
    ESOPHAGUS
        RADIOLOGY, 2318
    ILEUM
        OBSTRUCTION, 2539
    LARGE INTESTINE, 2620
        FIBER, 2604*
        SURGERY, 2621
    LIVER
        ANGIOGRAPHY, 2302
    PANCREAS
        DIARRHEA, 2925
        SECRETIN, 2687
    SALIVARY GLANDS
        MORPHOLOGY, 2903
    SMALL INTESTINE, 2559
        COMPLICATIONS, 2551
        IMMUNOLOGY, 2517

NEOPLASMS, BENIGN
    SEE ALSO POLYPS
    BILIARY TRACT, 2866
    DUODENUM, 2359
    ESOPHAGUS, 2329
    LIVER, 2738
    MESENTERY, 2632
    PANCREAS
        DISEASES ASSOCIATED WITH, 2691
    SALIVARY GLANDS, 2892, 2912
    SMALL INTESTINE, 2510*
    STOMACH, 2357, 2359, 2395
        PEPTIC ULCER, 2367
        REVIEWS, 2399

EOPLASMS, MALIGNANT
    APPENDIX
        METASTASIS, 2628
    BILE DUCT
        CYSTS, 2856
    CELIAC DISEASE
        DISEASES ASSOCIATED WITH, 2603
    CIRRHOSIS
        DISEASES ASSOCIATED WITH, 2824*
    COLON
        ANTIGEN, CARCINOEMBRYONIC, 2607*
        ULCERATIVE COLITIS, 2680
    ESOPHAGUS
        ACHALASIA, 2335
        DIVERTICULUM, 2336
        RADIOTHERAPY, 2342
        SURGERY, 2341
    ETHNIC FACTORS
        ANTIGEN, AUSTRALIA, 2791
    GALLBLADDER, 2628
        CALCIFICATION, 2873
        ETHNIC FACTORS, 2847*
    LARGE INTESTINE, 2648, 2651, 2672
        CHEMOTHERAPY, 2893
        EPIDEMIOLOGY, 2605*
        HERNIA, 2631
        SURGERY, 2654
        SURVIVAL, 2663
    LIVER, 2738, 2762
        ANTIGEN, AUSTRALIA, 2744, 2791
        BIOPSY, 2246, 2729*
        CHEMOTHERAPY, 2606*, 2754
        CIRCULATION, 2734, 2752
        EPIDEMIOLOGY, 2732*, 2761
        FETOPROTEIN, ALPHA, 2743, 2755,
          2763, 2765
        IMMUNOLOGY, 2732*
        METASTASIS, 2748, 2758
        MORPHOLOGY, 1995
        PERITONEOSCOPY, 2729*
        RUPTURE, 2733*
        SCANNING, SCINTILLATION, 2234*,
          2247
        SURGERY, 2759
    METASTASIS
        LARGE INTESTINE, 2606*
    PANCREAS
        CHEMOTHERAPY, 2695
        CYTOLOGY, 2276
        DISEASES ASSOCIATED WITH, 2691
        IMMUNOLOGY, 2694
    RECTUM
        IMMUNOLOGY, 2636
        METASTASIS, 2668
    REGIONAL ENTERITIS
        LARGE INTESTINE, 2639
    SALIVARY GLANDS, 2897, 2912
        SURVIVAL, 2899
    SMALL INTESTINE, 2510*
        DISEASES ASSOCIATED WITH, 2557
        INVASION, 2349
        MALABSORPTION, 2544
    STOMACH, 2354, 2374
        BURNS, 2376
        CHEMOTHERAPY, 2378
        COMPLICATIONS, 2362
        DIAGNOSIS, 2269
        DISEASES ASSOCIATED WITH, 2366,
          2402
        ENDOSCOPY, 2383
        EPIDEMIOLOGY, 2379
        LYMPHATICS, 2344*
        PORTAL HYPERTENSION, 2397
        RADIOLOGY, 2241
        RADIOTHERAPY, 2365, 2378
        RECURRENCE, 2352
        SEQUELAE, 2370
        STAINING TECHNIQUES, 2269
    ULCERATIVE COLITIS
        DISEASES ASSOCIATED WITH, 2680

NEPHRECTOMY
    GLUCOSE
        ABSORPTION, 2033

NERVOUS CONTROL
    ESOPHAGUS
        MOTILITY, 2041*, 2051*, 2065
    ILEUM
        MOTILITY, 2063
    LIVER
        ENZYMES, 2122
    PANCREAS
        ENZYMES, 2118*, 2122
    STOMACH
        ACID SECRETION, 2087*

NERVOUS SYSTEM
    COLON
        ANOMALY, CONGENITAL, 2624

  - LARGE INTESTINE
    - ELECTROPHYSIOLOGY, 2046*
  - SMALL INTESTINE
    - ELECTROPHYSIOLOGY, 2046*
    - MOTILITY, 2060
  - STOMACH
    - GASTRIN, 2085*
    - MOTILITY, 1996

NEUROHUMORAL AGENTS
- PEPTIC ULCER, 2460

NICOTINE
- PANCREAS
  - SECRETION, 2114*
- STOMACH
  - SECRETION, 2100

NOREPINEPHRINE
- GASTROINTESTINAL
  - BLEEDING, 2879*

NUCLEIC ACIDS
- METABOLISM
  - LIVER, 2189, 2197
- SYNTHESIS
  - CARCINOGENESIS, 2172
  - EMBRYOLOGY, 2172
  - LIVER, 2197
  - LYMPHOCYTE, 1999
  - NEONATE, 2197

NUCLEOTIDES
- LIVER
  - ALCOHOL, 2180

OBESITY
- SHUNTS, INTESTINAL
  - DISEASES ASSOCIATED WITH, 2568

OBSTRUCTION
- BILE DUCT
  - CHOLECYSTOKININ, 2857
  - RADIOLOGY, 2857
- BILIARY TRACT
  - IMMUNOLOGY, 2804*
  - PEPTIC ULCER, 2876
  - RESPIRATORY SYSTEM, 2137
- CIRCULATION
  - LIVER, 2841
- DUODENUM
  - CHILDREN, 2521
  - CIRCULATION, 2533
  - ETIOLOGY, 2521, 2702
  - STENOSIS, 2542
- GASTRECTOMY
  - COMPLICATIONS, 2387
- GASTROINTESTINAL
  - RADIOLOGY, 2267
- ILEUM, 2624
  - ENDOMETRIOSIS, 2543
  - NEOPLASMS, 2539
- SMALL INTESTINE, 2512
  - EDEMA, 2518
  - SODIUM, 2520
  - THERAPY, 2520
- VAGOTOMY
  - SEQUELAE, 2486

OBSTRUCTIVE JAUNDICE
- SEE JAUNDICE, OBSTRUCTIVE

OCCUPATIONAL FACTORS
- HEPATITIS, VIRAL, 2784, 2785
- LIVER
  - ALCOHOL DEHYDROGENASE, 2177

OMENTUM
- ABSORPTION, 2026

OMPHALOCELES
- THERAPY, 2907

OXYGEN
- BLOOD
  - LIVER DISEASE, ALCOHOLIC, 2811*
- METABOLISM
  - CIRCADIAN RHYTHM, 2144

PAIN
- ABDOMEN
  - PANCREATITIS, 2721
- BILIARY TRACT
  - ANGIOGRAPHY, 2870
- DUODENUM
  - ULCER, 2501

PANCREAS
- ABSCESS, 2698
- ADENOSINE TRIPHOSPHATASE
  - ISOLATION, 2108*
- ANOMALY, CONGENITAL, 2690, 2697, 2700, 2702
- ATROPHY
  - CARBONIC ANHYDRASE, 2121
- CHEMICAL COMPOSITION
  - FEEDING, 2113*
- CIRCULATION
  - MORPHOLOGY, 2214
  - PANCREATITIS, 2211*
- CYSTS
  - SURGERY, 2717
- DIAGNOSIS
  - ANGIOGRAPHY, 2250
  - CHYMOTRYSIN, 2245
  - CONTRAST MEDIA, 2233*
  - ECHOGRAPHY, 2243
  - ENDOSCOPY, 2722
  - LIPASE, 2245
  - TRYPSIN, 2245
- ENDOSCOPY
  - TECHNIQUES, 2279
- ENZYMES
  - CALCIUM, 2123
  - CARBOHYDRATES, 2119
  - CYSTIC FIBROSIS, 2699
  - GASTRIN, 2118*
  - ISOLATION, 2112*
  - NERVOUS CONTROL, 2118*, 2122
  - PERFUSION, 2116*
- GASTRIN, 2117*
- INSULIN
  - CYCLIC ADENOSINE MONOPHOSPHATE, 2072
- NECROSIS
  - PREGNANCY, 2716
- NEOPLASMS
  - DIARRHEA, 2925

    SECRETIN, 2687
  NEOPLASMS, BENIGN
    DISEASES ASSOCIATED WITH, 2691
  NEOPLASMS, MALIGNANT
    CHEMOTHERAPY, 2695
    CYTOLOGY, 2276
    DISEASES ASSOCIATED WITH, 2691
    IMMUNOLOGY, 2694
  PEPTIDES
    CHEMICAL COMPOSITION, 2111*
  PROTEIN
    DEFICIENCY, 2109*
  PSEUDOCYST
    COMPLICATIONS, 2708*
    THERAPY, 2711
  SECRETION
    AMYLASE, 2115*
    BILE ACIDS, 2120
    CALCIUM, 2123
    DIETARY FACTORS, 2109*
    DRUG EFFECTS ON, 2115*
    ENZYMES, 2112*
    ETHIONINE, 2109*
    HORMONE EFFECTS ON, 2110*
    INHIBITION, 2114*
    NICOTINE, 2114*
    PANCREATITIS, 2709*
    PHENOBARBITAL, 2109*
    SJOGRENS SYNDROME, 2693
    THERAPY, 2703
    VASOPRESSIN, 2110*
  TRAUMA, 2692
    REVIEWS, 2696
  ULTRASTRUCTURE, 1993
    PERFUSION, 2116*

PANCREAS FUNCTION TESTS
  PEPTIC ULCER
    SURGERY, 2462 , 2475
  SCHISTOSOMIASIS
    LIVER, 2942

PANCREATIC DUCT
  CALCULI
    SURGERY, 2689
  ENDOSCOPY, 2233*
    TECHNIQUES, 2279
  RUPTURE
    PANCREATITIS, 2724

PANCREATITIS, 2725
  ABDOMEN
    PAIN, 2721
  BILE
    PHOSPHOLIPID, 2704*
  BILIARY TRACT
    SURGERY, 2713
  BLEEDING, 2712
    SURGERY, 2707*
  CHOLECYSTECTOMY
    SEQUELAE, 2865
  CIRCULATION
    VASOPRESSIN, 2211*
  COLON
    FISTULA, 2727
  COMPLICATIONS
    ASCITES, 2724
  DISEASES ASSOCIATED WITH
    INFECTION, VIRAL, 2726
  DRUG TREATMENT
    GLUCAGON, 2092
  ETIOLOGY, 2720
    CORTICOSTEROIDS, 2718
    DRUGS, 2728
    PHOSPHOLIPID, 2704*
    STEROIDS, 2705*
  GLUCOSE
    METABOLISM, 2728
  KIDNEY
    TRANSPLANTATION, 2706*
  LIPID
    METABOLISM, 2723
  LIPOPROTEIN
    METABOLISM, 2705*
  PANCREAS
    CIRCULATION, 2211*
    SECRETION, 2709*
  PANCREATIC DUCT
    RUPTURE, 2724
  PERITONEUM
    DIALYSIS, 2719
  REVIEWS, 2715
  THERAPY, 2720
    SECRETIN, 2709*

PANCREATITIS, CHRONIC, 2714

PARACENTESIS
  PERITONITIS
    FOREIGN BODIES, 2232*

PARASITES AND PARASITIC DISEASE
  ALLERGY, 2958
  BILIARY TRACT
    FISTULA, 2826*
  DIAGNOSIS
    IMMUNOLOGY, 2943
  DIARRHEA
    DRUG TREATMENT, 2948
    ETIOLOGY, 2948
  ENVIRONMENTAL FACTORS, 2945
  EPIDEMIOLOGY
    CHILDREN, 2946
  ETHNIC FACTORS, 2945
  LACTASE DEFICIENCY
    CHILDREN, 2961

PARATHYROID GLAND
  PEPTIC ULCER
    DISEASES ASSOCIATED WITH, 2491
  STOMACH
    SECRETION, 2086*
  ZOLLINGER-ELLISON SYNDROME
    DISEASES ASSOCIATED WITH, 2881*

PARATYPHOID FEVER
  SEE SALMONELLOSIS

PARIETAL CELL
  STOMACH
    RADIATION, 2401
    ULTRASTRUCTURE, 1974*

- PENTAGASTRIN
  - ESOPHAGUS
    - MOTILITY, 2067
  - STOMACH
    - ACID SECRETION, 2104
    - CARBONIC ANHYDRASE, 2099

- PEPSIN SECRETION
  - STOMACH
    - ALCOHOL, 2081*
    - ASPIRIN, 2081*
    - CATECHOLAMINES, 2076*
    - DIAGNOSIS, 2239
    - ENDOCRINE SYSTEM, 2076*
    - HORMONE EFFECTS ON, 2076*

- PEPTIC ULCER
  - SEE ALSO STOMACH ULCER, DUODENUM ULCER, 2900
  - ACID SECRETION
    - DRUG EFFECTS ON, 2439
    - STOMACH, 2445
    - SURGERY, 2407*, 2409*, 2414*
  - AGE FACTORS, 2436, 2483
  - ANTIINFLAMMATORY AGENTS, 2433
  - BILIARY TRACT
    - OBSTRUCTION, 2876
  - BLEEDING
    - CHILDREN, 2485
    - PREGNANCY, 2345
  - CHILDREN, 2480
  - CRYOTHERAPY, 2438
  - DIAGNOSIS
    - ACID SECRETION, 2406*
    - GASTRIN, 2235*
  - DISEASES ASSOCIATED WITH
    - CIRCULATION, 2446
    - PARATHYROID GLAND, 2491
    - UROGENITAL SYSTEM, 2441
  - DRUG EFFECTS ON, 2429
  - DRUG TREATMENT, 2421, 2455, 2458, 2468, 2470
    - ACID SECRETION, 2469
  - DUODENUM
    - NEOPLASMS, 2562
  - EPIDEMIOLOGY, 2428
    - ENVIRONMENTAL FACTORS, 2488
  - ESOPHAGUS, 2432
    - MOTILITY, 2503
  - ETIOLOGY, 2498
    - BACTERIA, 2416*
    - BILE ACIDS, 2411*
    - PHYSICAL ACTIVITY, 2479
    - PITUITARY GLAND, 2437
    - SEASONAL FACTORS, 2493
    - SHOCK, 2055*, 2411*
    - STARVATION, 2478
    - STRESS, 2411*, 2416*, 2442, 2476
  - GASTRECTOMY
    - BLEEDING, 2459
  - HEALING, 2498
    - ENVIRONMENTAL FACTORS, 2408*
  - HERNIA, HIATUS
    - DISEASES ASSOCIATED WITH, 2315*
  - MECKELS DIVERTICULUM
    - DISEASES ASSOCIATED WITH, 2540
  - MOTILITY
    - DRUG EFFECTS ON, 2440
  - MUD THERAPY, 2456
  - NEUROHUMORAL AGENTS, 2460
  - PERFORATION, 2435, 2453
    - PROGNOSIS, 2454
    - SURGERY, 2423, 2457
  - PREVENTION
    - DRUGS, 2093
  - PYLORUS
    - ANTRUM, 2473
    - COMPLICATIONS, 2350
  - RADIOLOGY, 2369
  - REGIONAL ENTERITIS
    - DISEASES ASSOCIATED WITH, 2571*
  - SECRETION
    - STOMACH, 2463
  - STOMACH
    - NEOPLASMS, BENIGN, 2367
  - STRESS
    - ADRENERGIC BLOCKING AGENTS, 2422
  - SURGERY, 2094, 2427
    - ACID SECRETION, 2472
    - AGE FACTORS, 2410*, 2450
    - DRUG TREATMENT, 2430
    - GLUCOSE INTOLERANCE, 2447
    - PANCREAS FUNCTION TESTS, 2475
    - PANCREATIC FUNCTION TESTS, 2462
    - SEQUELAE, 2448, 2464, 2466, 2496
    - SMALL INTESTINE, 2502
    - TECHNIQUES, 2443, 2474, 2477
    - THERAPY, 2417
    - VAGOTOMY, 2444
  - THERAPY
    - PHYSICAL FACTORS, 2490
  - VAGOTOMY
    - TECHNIQUES, 2451, 2471, 2482

- PEPTIDASE
  - SMALL INTESTINE
    - CELIAC DISEASE, 2602

- PEPTIDES
  - PANCREAS
    - CHEMICAL COMPOSITION, 2111*
  - STOMACH
    - SECRETION, 2111*
  - TOXICITY
    - HEPATECTOMY, 2186

- PERFORATION
  - APPENDICITIS, 2615
    - PERITONITIS, 2656
  - CECUM
    - TRANSFUSION, 2653
  - DUODENUM
    - ULCER, 2423
  - INTESTINE
    - TUBERCULOSIS, 2527
  - MECKELS DIVERTICULUM, 2531
    - COMPLICATIONS, 2569
  - PEPTIC ULCER, 2435, 2453
    - PROGNOSIS, 2454
    - SURGERY, 2423, 2457
  - SMALL INTESTINE, 2274
    - COLLAGEN DISEASES, 2549
    - FOREIGN BODIES, 2553

- PERFUSION
  - LIVER
    - TECHNIQUES, 2145

- TRANSPLANTATION, 2171
- PANCREAS
  - ENZYMES, 2116*
  - ULTRASTRUCTURE, 2116*
- SMALL INTESTINE
  - ADENOSINE TRIPHOSPHATE, 2209
  - GLYCOLYSIS, 2209

ERISTALSIS
- ESOPHAGUS
  - MOTILITY, 2050*, 2052*
- STOMACH
  - DRUG EFFECTS ON, 2068

ERITONEOSCOPY
- COMPLICATIONS, 2308
- GASTROINTESTINAL
  - DIAGNOSIS, 2265
- LIVER
  - NEOPLASMS, MALIGNANT, 2729*

ERITONEUM
- ABSORPTION, 2026
- DIALYSIS
  - PANCREATITIS, 2719

ERITONITIS
- ABSCESS
  - LIVER, 2750
- AMEBIASIS
  - COMPLICATIONS, 2939*
- APPENDICITIS
  - PERFORATION, 2656
- DRAINAGE, 2910
- FOREIGN BODIES, 2927
  - PARACENTESIS, 2232*
  - STEROIDS, 2884*
- SURVIVAL
  - CONTRAST MEDIA, 2221
- TUBERCULOSIS, 2935

ROXIDASE
- ABSORPTION
  - AGE FACTORS, 2018*

ENOBARBITAL
- BILE
  - CHEMICAL COMPOSITION, 2134*
  - LIPIDS, 2134*
- BILE ACIDS
  - SYNTHESIS, 2134*
- LIVER
  - ALBUMIN, 2139
  - LIPIDS, 2152
- PANCREAS
  - SECRETION, 2109*
- PROTEIN
  - SYNTHESIS, 2175
- SMALL INTESTINE
  - ABSORPTION, 2011*

ENOLS
- CARBOHYDRATE
  - METABOLISM, 2183

OSPHATASE, ACID
- LIVER
  - SHOCK, 2168

PHOSPHATASE, ALKALINE
- BILIARY TRACT
  - ATRESIA, 2852*
- BLOOD
  - CHOLECYSTECTOMY, 2863

PHOSPHOLIPID
- BILE
  - PANCREATITIS, 2704*
- LIVER
  - DRUG EFFECTS ON, 2192
- PANCREATITIS
  - ETIOLOGY, 2704*

PHOSPHORUS
- DETOXIFICATION
  - LIVER, 2773

PHOTOTHERAPY
- HYPERBILIRUBINEMIA, 2124*

PHYSICAL ACTIVITY
- PEPTIC ULCER
  - ETIOLOGY, 2479

PHYSICAL FACTORS
- ACID SECRETION
  - STOMACH, 2420
- LARGE INTESTINE
  - TRAUMA, 2630
- PEPTIC ULCER
  - THERAPY, 2490

PITUITARY GLAND
- PEPTIC ULCER
  - ETIOLOGY, 2437

PLASMA
- SEE BLOOD
- BILIRUBIN
  - SECRETION, 2130*
- GLYCOSIDES, 2143

POLYPHENOLS
- METABOLISM
  - INTESTINE, 2206

POLYPS
- SEE ALSO NEOPLASMS, BENIGN
- COLON
  - FAMILIAL FACTORS, 2632
- LARGE INTESTINE
  - ENDOSCOPY, 2655
  - SURGERY, 2666

PORPHYRIA
- DISEASES ASSOCIATED WITH, 2710*
- ETIOLOGY
  - FAMILIAL FACTORS, 2731*

PORPHYRIN
- SYNTHESIS
  - AGE FACTORS, 2193

PORTAL HYPERTENSION
- SHUNT
  - SURGERY, 2842, 2843
- STOMACH
  - NEOPLASMS, MALIGNANT, 2397

- POTASSIUM
  - LIVER
    - ALKALOIDS, 2190

- PREGNANCY
  - ANTIGEN, AUSTRALIA, 2795
  - CARBOHYDRATE
    - METABOLISM, 2184
  - CHOLESTEROL
    - METABOLISM, 2073
  - HEPATITIS, VIRAL
    - AMINO ACIDS, 2789
  - LIPIDS
    - METABOLISM, 2184
  - LIVER
    - CADMIUM, 2174
    - CARCINOGENESIS, 1995
    - ULTRASTRUCTURE, 2194
  - LIVER DISEASE
    - DISEASES ASSOCIATED WITH, 2760
    - ETHNIC FACTORS, 2760
    - JAUNDICE, 2760
  - PANCREAS
    - NECROSIS, 2716
  - PEPTIC ULCER
    - BLEEDING, 2345

- PRESSURE STUDIES
  - BILIARY TRACT
    - ANALGESICS, 2149
    - MOTILITY, 2042*
    - NARCOTICS, 2149
  - ESOPHAGUS
    - MOTILITY, 2044*
    - TECHNIQUES, 2065
  - STOMACH
    - MOTILITY, 2048*

- PREVENTION
  - ADHESIONS
    - SIMULATION, 2914
  - CHOLELITHIASIS
    - BILE ACIDS, 2855
  - HEPATITIS, VIRAL
    - TECHNIQUES, 2289
    - TRANSMISSION, 2291
  - LIVER INJURY
    - CARBON TETRACHLORIDE, 2128*
  - PEPTIC ULCER
    - DRUGS, 2093

- PROGNOSIS
  - PEPTIC ULCER
    - PERFORATION, 2454

- PROLAPSE
  - RECTUM
    - SURGERY, 2664
  - SMALL INTESTINE, 2637

- PROSTAGLANDIN
  - ESOPHAGUS
    - MOTILITY, 2067
  - ION TRANSPORT
    - SODIUM, 2020*
  - STOMACH
    - ACID SECRETION, 2098

- PROTEASE
  - STOMACH
    - ELECTROPHORESIS, 2102

- PROTEIN
  - DEFICIENCY
    - PANCREAS, 2109*
    - STOMACH, 1985
  - STOMACH
    - CHEMICAL COMPOSITION, 1985
  - SYNTHESIS
    - DRUG EFFECTS ON, 2175
    - LIVER, 2175
    - PHENOBARBITAL, 2175

- PSEUDOCYST
  - PANCREAS
    - COMPLICATIONS, 2708*
    - THERAPY, 2711

- PSYCHOLOGICAL FACTORS
  - COLOSTOMY
    - THERAPY, 2652
  - ILEOSTOMY
    - THERAPY, 2652
  - IRRITABLE COLON, 2611*
  - ULCERATIVE COLITIS, 2611*
  - VOMITING, 2938

- PYLOROPLASTY
  - DUODENUM
    - ULCER, 2424

- PYLORUS
  - SEE ALSO STOMACH
  - ANOMALY
    - ETIOLOGY, 2350
  - ANOMALY, CONGENITAL, 2403
  - ANTRUM
    - PEPTIC ULCER, 2473
  - PEPTIC ULCER
    - COMPLICATIONS, 2350
  - STENOSIS
    - BLOOD VOLUME, 2389
    - NEONATE, 2382
    - RADIOLOGY, 2394

- PYROGEN
  - STOMACH
    - STASIS, 2059

- RADIATION
  - ILEUS
    - ETIOLOGY, 2563
  - SMALL INTESTINE
    - MITOSIS, 1988
    - MOTILITY, 1988
  - STOMACH
    - PARIETAL CELL, 2401
    - SECRETION, 2400
    - SUCRASE, 2405

- RADIOLOGY
  - ANORECTUM
    - ANOMALY, 2288
  - BILE DUCT
    - OBSTRUCTION, 2857
  - BILIARY TRACT
    - CELIAC DISEASE, 2280
    - CROHNS DISEASE, 2280

    - TECHNIQUES, 2259, 2260
  - CHOLECYSTITIS
    - GANGRENE, 2874
  - COLON
    - MOTILITY, 2285
  - DUODENUM
    - ATRESIA, 2528
    - DIAGNOSIS, 2262
  - ESOPHAGUS, 2369
    - MOTILITY, 2309
    - NEOPLASMS, 2318
  - GASTROINTESTINAL
    - BLEEDING, 2253, 2264
    - OBSTRUCTION, 2267
    - TECHNIQUES, 2304
  - ILEUM
    - DIAGNOSIS, 2293
  - ILEUS
    - DIAGNOSIS, 2293
  - JAUNDICE
    - TECHNIQUES, 2259
  - LARGE INTESTINE
    - COMPLICATIONS, 2634
  - LIVER
    - CIRCULATION, 2263
    - CYSTS, 2257
  - PEPTIC ULCER, 2369
  - PYLORUS
    - STENOSIS, 2394
  - SMALL INTESTINE
    - MOTILITY, 2285
    - STENOSIS, 2293
  - STOMACH, 2369
    - MOTILITY, 2272
    - NEOPLASMS, MALIGNANT, 2241
    - ULCER, 2301

- ADIOTELEMETRY
  - COMPLICATIONS, 2274
  - ESOPHAGUS
    - REFLUX, 2271
  - STOMACH
    - MOTILITY, 2056

- ADIOTHERAPY
  - ESOPHAGUS
    - NEOPLASMS, MALIGNANT, 2342
  - STOMACH
    - NEOPLASMS, MALIGNANT, 2365, 2378

- ECTUM
  - SEE ALSO LARGE INTESTINE
  - CARCINOIDS
    - DISEASES ASSOCIATED WITH, 2609*
    - SURGERY, 2609*
  - CYTOLOGY, EXFOLIATIVE
    - TECHNIQUES, 2227*
  - DISEASES, 2635
  - DISSACHARIDASE
    - MALABSORPTION, 2586*
  - ENDOMETRIOSIS, 2657
  - NEOPLASMS, MALIGNANT
    - IMMUNOLOGY, 2636
    - METASTASIS, 2668
  - PROLAPSE
    - SURGERY, 2664
  - ULCERS
    - BLEEDING, 2667

- RECTUM DISEASE
  - SJOGRENS SYNDROME, 2693

- REFLUX
  - BILE
    - STOMACH, 2077*
  - ESOPHAGUS
    - MOTILITY, 2327
    - RADIOTELEMETRY, 2271
    - SPHINCTER, 2327
  - HERNIA, HIATUS
    - SURGERY, 2312*

- REGENERATION
  - LIVER
    - ENZYMES, 2189
    - GLUCAGON, 2169

- REGIONAL ENTERITIS
  - SEE ALSO ENTERITIS
  - ANUS
    - THERAPY, 2643
    - ULCER, 2579
  - CHILDREN, 2576
  - DIAGNOSIS, 2577
  - DISEASES ASSOCIATED WITH
    - PEPTIC ULCER, 2571*
  - DUODENUM
    - BLEEDING, 2578
  - EPIDEMIOLOGY, 2679*
  - LARGE INTESTINE
    - BLEEDING, 2646
    - NEOPLASMS, MALIGNANT, 2639
    - RECURRENCE, 2608*
    - SURGERY, 2681
    - THERAPY, 2671
  - REVIEWS, 2574
  - SURGERY
    - IMMUNOGLOBULINS, 2677*
    - SEQUELAE, 2575

- REJECTION
  - LIVER
    - ULTRASTRUCTURE, 2153

- RENIN
  - ANTIENZYMES
    - BILE, 1970*
  - INHIBITION
    - BILE ACIDS, 2148

- RESPIRATORY SYSTEM
  - BILIARY TRACT
    - OBSTRUCTION, 2137
  - CIRCULATION
    - CIRRHOSIS, 2829*
  - CIRRHOSIS
    - DISEASES ASSOCIATED WITH, 2824*, 2828*
  - ENDOSCOPY
    - COMPLICATIONS, 2256
  - ESOPHAGUS
    - MOTILITY, 2044*, 2052*
  - HELMINTHIASIS
    - DISEASES ASSOCIATED WITH, 2955
  - HERNIA, HIATUS
    - DISEASES ASSOCIATED WITH, 2339
  - INFECTION, BACTERIA
    - LIVER DISEASE, ALCOHOLIC, 2816

- RETICULOENDOTHELIAL SYSTEM
  - HEPATITIS, VIRAL
    - DISEASES ASSOCIATED WITH, 2802

- REVIEWS
  - CROHNS DISEASE, 2683
    - STOMACH, 2574
  - DRUG TREATMENT
    - DIARRHEA, 2929
    - NAUSEA, 2929
    - VOMITING, 2929
  - GASTROINTESTINAL, 2936
  - HELMINTHIASIS
    - INTESTINE, 2947
  - INTESTINE
    - ABSORPTION, 2040
    - SECRETION, 2040
  - IRRITABLE COLON
    - DRUG TREATMENT, 2642
  - LIVER
    - TRANSPLANTATION, 2749
  - MALABSORPTION, 2598
    - CHILDREN, 2601
  - MENETRIERS DISEASE, 2390
  - NEOPLASMS
    - COLON, 2640
  - PANCREAS
    - TRAUMA, 2696
  - PANCREATITIS, 2715
  - REGIONAL ENTERITIS, 2574
  - SMALL INTESTINE
    - MOTILITY, 2061
  - STOMACH
    - NEOPLASMS, BENIGN, 2399
    - SECRETION, 2096
    - ULCER, 2494
  - ULCERATIVE COLITIS, 2683

- RIBOSOMES
  - LIVER
    - ALBUMIN, 2195

- RUPTURE
  - AMEBIASIS
    - LIVER, 2939*
  - DUODENUM
    - TRAUMA, 2532
  - ESOPHAGUS, 2319
  - LARGE INTESTINE
    - AMEBIASIS, 2939*
  - LIVER
    - NEOPLASMS, MALIGNANT, 2733*
  - PANCREATIC DUCT
    - PANCREATITIS, 2724
  - SIGMOID, 2637
  - STOMACH, 2392
    - ENDOSCOPY, 2391

- SALIVARY GLANDS
  - MITOSIS
    - AUTORADIOGRAPHY, 2215
  - MORPHOLOGY
    - AGE FACTORS, 2225
    - NEOPLASMS, 2903
  - NEOPLASMS, BENIGN, 2892, 2912
  - NEOPLASMS, MALIGNANT, 2897, 2912
    - SURVIVAL, 2899

- SALMONELLOSIS
  - EPIDEMIOLOGY, 2919
  - TRANSMISSION, 2923

- SARCOIDOSIS
  - CIRRHOSIS, BILIARY
    - DISEASES ASSOCIATED WITH, 2823*
  - STOMACH
    - SURGERY, 2377

- SCANNING, SCINTILLATION
  - LIVER
    - CYSTIC FIBROSIS, 2686*
    - NEOPLASMS, MALIGNANT, 2234*, 2247
  - LIVER DISEASE
    - DIAGNOSIS, 2292
  - MECKELS DIVERTICULUM
    - BLEEDING, 2525

- SCHISTOSOMIASIS
  - LIVER
    - PANCREAS FUNCTION TESTS, 2942

- SCLERODERMA
  - GASTROINTESTINAL, 2924

- SEASONAL FACTORS
  - PEPTIC ULCER
    - ETIOLOGY, 2493

- SECRETIN
  - BILE
    - SECRETION, 2825*
  - PANCREAS
    - NEOPLASMS, 2687
  - PANCREATITIS
    - THERAPY, 2709*
  - STOMACH
    - ACID SECRETION, 2104
    - SECRETION, 2089*

- SECRETION
  - BILE
    - CIRCULATION, 2166
    - CIRRHOSIS, 2825*
    - 2-DEOXY-D-GLUCOSE, 2125*
    - ELECTROLYTE, 2198
    - GLYCOSIDES, 2143
    - INSULIN, 2125*
    - MERCURY, 2027
    - SECRETIN, 2825*
    - SPECIES DIFFERENCES, 2198
    - VAGOTOMY, 2125*
  - BILIRUBIN
    - INHIBITION, 2130*
    - PLASMA, 2130*
  - CALCIUM
    - STOMACH, 2491
  - ELECTROLYTE
    - SMALL INTESTINE, 2004*
  - GASTRIN
    - ACIDOSIS, 2210*
    - ALKALOSIS, 2210*
  - HORMONE
    - ACIDOSIS, 2210*
    - ALKALOSIS, 2210*
  - INTESTINE
    - REVIEWS, 2040
  - INTRINSIC FACTOR
    - DIABETES, 2398

  LIVER
    BILE ACIDS, 2038
  PANCREAS
    AMYLASE, 2115*
    BILE ACIDS, 2120
    CALCIUM, 2123
    DIETARY FACTORS, 2109*
    DRUG EFFECTS ON, 2115*
    ENZYMES, 2112*
    ETHIONINE, 2109*
    HORMONE EFFECTS ON, 2110*
    INHIBITION, 2114*
    NICOTINE, 2114*
    PANCREATITIS, 2709*
    PHENOBARBITAL, 2109*
    SJOGRENS SYNDROME, 2693
    THERAPY, 2703
    VASOPRESSIN, 2110*
  SMALL INTESTINE
    CHOLERA, 2013*, 2204*
    DIETARY FACTORS, 2203*
    IMMUNOGLOBULINS, 2508*
  STOMACH
    ACIDITY, 2207
    CALCIUM, 2086*
    CHOLECYSTOKININ, 2089*
    DIAGNOSIS, 2237
    DRUG EFFECTS ON, 2355
    ELECTROLYTE, 2286
    ENTEROGASTRONE, 2089*
    GASTRIN, 2089*, 2090*
    HISTAMINE, 2089*
    HORMONE EFFECTS ON, 2086*
    IMMUNOGLOBULINS, 2364
    INHIBITION, 2095
    NICOTINE, 2100
    PARATHYROID GLAND, 2086*
    PEPTIC ULCER, 2463
    PEPTIDES, 2111*
    RADIATION, 2400
    REVIEWS, 2096
    SECRETIN, 2089*
    TECHNIQUES, 2237, 2239
    VASOCONSTRICTORS, 1991

SEDATIVES
  METABOLISM
    LIVER DISEASE, 2753

SEROLOGY
  INFECTIONS, VIRAL
    DIAGNOSIS, 2299

SERUM
  SEE BLOOD

SHIGELLOSIS
  APPENDICITIS
    ETIOLOGY, 2647
  DIARRHEA
    CHILDREN, 2933
  DYSENTERY
    EPIDEMIOLOGY, 2922
    ETIOLOGY, 2917
  ENTERITIS
    MORPHOLOGY, 2885*

SHOCK
  LIVER
    CIRCULATION, 2213*
    PHOSPHATASE, ACID, 2168
  PEPTIC ULCER
    ETIOLOGY, 2055*, 2411*
  STOMACH
    ELECTROPHYSIOLOGY, 2055*
    ION TRANSFER, 2055*

SHUNT
  LIVER
    CIRCULATION, 2843
    TRANSPLANTATION, 2164
  SURGERY
    CIRRHOSIS, 2844
    LIVER, 2839
    PORTAL HYPERTENSION, 2842, 2843

SHUNTS, INTESTINAL
  OBESITY
    DISEASES ASSOCIATED WITH, 2568

SIGMOID
  SEE ALSO LARGE INTESTINE
  ENDOSCOPY
    TECHNIQUES, 2298
  RUPTURE, 2637
  VOLVULUS, 2626
    THERAPY, 2673

SJOGRENS SYNDROME
  PANCREAS
    SECRETION, 2693
  RECTUM DISEASE, 2693
  SMALL INTESTINE DISEASE, 2693
  STEATORRHEA, 2693

SMALL INTESTINE
  SEE ALSO DUODENUM, JEJUNUM, ILEUM
  SEE ALSO INTESTINE
  ABSORPTION
    AGE FACTORS, 2018*
    AMINO ACIDS, 2009*, 2028, 2029
    ATROPINE, 2006*
    BILE, 2015*
    BILE ACIDS, 2008*
    CALCIUM, 2005*
    CHOLERA, 2013*
    FATTY ACIDS, 2012*
    INJURY, 2023*
    IRON, 2002*, 2003*, 2011*
    KINETICS, 2009*, 2023*
    LIPIDS, 2015*
    PHENOBARBITAL, 2011*
    SUGAR, 2007*, 2039
    SURGERY, 2039
    VITAMIN B12, 2014*
  ADENOSINE TRIPHOSPHATASE
    BILE ACIDS, 2202*
    FATTY ACIDS, 2202*
  AMYLOIDOSIS, 2891
  ANOMALY
    CHOLECYSTITIS, 2524
  ANOMALY, CONGENITAL
    ABDOMEN, ACUTE, 2548
  ATRESIA
    ETIOLOGY, 2534
  BACTERIA, 2075*
    MALABSORPTION, 2581*
    STASIS SYNDROME, 2580*

- BLEEDING
  - DISEASES ASSOCIATED WITH, 2351
- CARCINOIDS
  - DISEASES ASSOCIATED WITH, 2529
  - SEQUELAE, 2564
- CHOLESTEROL
  - DEFICIENCY, 1981*
- DISEASE
  - CHILDREN, 2558
- ELECTROLYTE
  - ABSORPTION, 2004*
  - SECRETION, 2004*
- ELECTROPHYSIOLOGY
  - DRUG EFFECTS ON, 2045*
  - NERVOUS SYSTEM, 2046*
- ENZYMES
  - CIRCADIAN RHYTHM, 2205
  - ISOLATION, 1973*
- EXTRUSION, 2565
- FISTULA
  - COMPLICATIONS, 2536
  - SURGERY, 2546
  - THERAPY, 2536
- FOLIC ACID
  - DEFICIENCY, 2505*
- HEMATOMA
  - ANTICOAGULANTS, 2552
- HERNIA, 2565
- IMMUNOGLOBULINS
  - CHILDREN, 2508*
  - HEPATITIS, VIRAL, 2794
- INJURY
  - ABSORPTION, 2511*
  - CHOLERA, 2204*
- ION TRANSPORT
  - CALCIUM, 2024*
  - DIETARY FACTORS, 2024*
  - HORMONE, 2022*
- LIPIDS
  - METABOLISM, 2015*
- LYMPHOCYTE, 1999
  - AGE FACTORS, 1998
- MEMBRANE
  - ENZYMES, 2201*
  - ISOLATION, 1973*
- METABOLISM
  - TRANSFUSION, 2512
- MITOSIS
  - GNOTOBIOSIS, 1988
  - RADIATION, 1988
- MORPHOLOGY
  - ALBUMIN, 1977*
  - ALCOHOL, 2505*
  - ANTIENZYMES, 1981*
  - SPECIES DIFFERENCES, 1983
  - WHIPPLES DISEASE, 2545
- MOTILITY
  - AMINO ACIDS, 1986
  - ANTIEMETICS, 2070
  - DRUG EFFECTS ON, 2305
  - ELECTROPHYSIOLOGY, 2305
  - GNOTOBIOSIS, 1988
  - NERVOUS SYSTEM, 2060
  - RADIATION, 1988
  - RADIOLOGY, 2285
  - REVIEWS, 2061
  - SURGERY, 2060
- NEOPLASMS, 2559
  - COMPLICATIONS, 2551
  - IMMUNOLOGY, 2517
- NEOPLASMS, BENIGN, 2510*
- NEOPLASMS, MALIGNANT, 2510*
  - DISEASES ASSOCIATED WITH, 2557
  - INVASION, 2349
  - MALABSORPTION, 2544
- OBSTRUCTION, 2512
  - EDEMA, 2518
  - SODIUM, 2520
  - THERAPY, 2520
- PEPTIC ULCER
  - SURGERY, 2502
- PEPTIDASE
  - CELIAC DISEASE, 2602
- PERFORATION, 2274
  - COLLAGEN DISEASES, 2549
  - FOREIGN BODIES, 2553
- PERFUSION
  - ADENOSINE TRIPHOSPHATE, 2209
  - GLYCOLYSIS, 2209
- PROLAPSE, 2637
- SECRETION
  - CHOLERA, 2013*, 2204*
  - DIETARY FACTORS, 2203*
  - IMMUNOGLOBULINS, 2508*
- STENOSIS
  - RADIOLOGY, 2293
- SURGERY
  - ACID SECRETION, 2087*
  - ANEMIA, PERNICIOUS, 2597
  - MALABSORPTION, 2591
  - TECHNIQUES, 2223
- TRANSPLANTATION, 2555
  - IMMUNOLOGY, 1990
  - MORPHOLOGY, 1990
  - TECHNIQUES, 2218
- TRAUMA, 2547, 2566
  - FOREIGN BODIES, 2618
- ULTRASTRUCTURE
  - ALBUMIN, 1977*
  - ENZYMES, 2201*
  - WHIPPLES DISEASE, 2545
- VILLI
  - BACTERIA, 1989
- VITAMIN B12
  - ABSORPTION, 2511*, 2597
- WATER TRANSPORT
  - HORMONE, 2022*

SMALL INTESTINE DISEASE
- SJOGRENS SYNDROME, 2693

SODIUM
- ION TRANSPORT
  - ILEUM, 2020*
  - PROSTAGLANDIN, 2020*
- SMALL INTESTINE
  - OBSTRUCTION, 2520
- STOMACH
  - MOTILITY, 2057

SONOGRAPHY
- SEE ECHOGRAPHY

SPECIES DIFFERENCES
- ALCOHOL
  - METABOLISM, 2161
- BILE
  - CHEMICAL COMPOSITION, 1982

    - SECRETION, 2198
  - SMALL INTESTINE
    - MORPHOLOGY, 1983

- SPHINCTER
  - ESOPHAGUS
    - REFLUX, 2327

- STAINING TECHNIQUES
  - STOMACH, 1975*
    - NEOPLASMS, MALIGNANT, 2269

- STARVATION
  - PEPTIC ULCER
    - ETIOLOGY, 2478

- STASIS
  - STOMACH
    - ETIOLOGY, 2059
    - PYROGEN, 2059

- STASIS SYNDROME
  - SMALL INTESTINE
    - BACTERIA, 2580*
  - STEATORRHEA
    - ETIOLOGY, 2580*

- STEATORRHEA
  - BILE ACIDS
    - MALABSORPTION, 2593
  - ETIOLOGY
    - STASIS SYNDROME, 2580*
  - SJOGRENS SYNDROME, 2693

- STEATOSIS
  - SEE FATTY LIVER

- STENOSIS
  - CECUM, 2550
  - DUODENUM
    - OBSTRUCTION, 2542
  - ILEUM, 2550
  - PYLORUS
    - BLOOD VOLUME, 2389
    - NEONATE, 2382
    - RADIOLOGY, 2394
  - SMALL INTESTINE
    - RADIOLOGY, 2293
  - STOMACH
    - BURNS, 2372

- STEROID
  - BLOOD
    - CHOLESTEROL, 2838
    - LIVER DISEASE, 2822*
  - CALCIUM
    - ION TRANSPORT, 2036
  - GASTROINTESTINAL
    - COMPLICATIONS, 2890
  - LIVER
    - COENZYMES, 2173
    - LYSOSOMES, 2176
    - ULTRASTRUCTURE, 2194
  - METABOLISM
    - BILE ACIDS, 2740
    - HORMONE CONTROL, 2185
  - PANCREATITIS
    - ETIOLOGY, 2705*
  - PERITONITIS
    - FOREIGN BODIES, 2884*

- STEROL
  - METABOLISM
    - HORMONE CONTROL, 2185

- STIMULATION
  - GASTRIN
    - CALCIUM, 2287

- STOMACH
  - SEE ALSO ANTRUM, PYLORUS
  - ABSORPTION
    - ASPIRIN, 2001*
  - ACID
    - ABSORPTION, 2406*
  - ACID SECRETION
    - AMINO ACIDS, 2101
    - ANTIDEPRESSANTS, 2106
    - ATROPINE, 2082*, 2107
    - BACTERIA, 2075*
    - BILE, 2077*, 2088*
    - BILE ACIDS, 2088*
    - CALCIUM, 2091*
    - 2-DEOXY-D-GLUCOSE, 2107
    - DIAGNOSIS, 2268
    - DRUG EFFECTS ON, 2429
    - ESOPHAGITIS, REFLUX, 2323
    - FEEDING, 2084*
    - GASTRIN, 2078*, 2091*
    - GLUCAGON, 2083*, 2092, 2097
    - HEARTBURN, 2266
    - HERNIA, HIATUS, 2317
    - HORMONE CONTROL, 2105
    - HORMONE EFFECTS ON, 2079*, 2080*
    - INHIBITION, 2080*, 2093
    - INJURY, 2094
    - INSULIN, 2107
    - NERVOUS CONTROL, 2087*
    - PENTAGASTRIN, 2104
    - PEPTIC ULCER, 2445
    - PHYSICAL FACTORS, 2420
    - PROSTAGLANDIN, 2098
    - SECRETIN, 2104
    - TECHNIQUES, 2229*, 2258, 2268, 2278
    - VOMITING, 2266
    - ZOLLINGER-ELLISON SYNDROME, 2284, 2913
  - ANOMALY
    - ETIOLOGY, 2363
  - ANOMALY, CONGENITAL
    - SURGERY, 2907
  - BILE
    - REFLUX, 2077*
  - BIOPSY
    - GASTRITIS, 2252
  - BLEEDING
    - DISEASES ASSOCIATED WITH, 2351
    - DRUG TREATMENT, 2386
  - CALCIUM
    - SECRETION, 2491
  - CARBONIC ANHYDRASE
    - CYCLIC ADENOSINE MONOPHOSPHATE, 2099
    - HISTAMINE, 2099
    - PENTAGASTRIN, 2099

- CARCINOGENESIS
  - INVASION, 2349
- CHEMICAL COMPOSITION
  - DIETARY FACTORS, 1985
  - HISTAMINE, 1985
  - PROTEIN, 1985
- CIRCULATION
  - GLUCAGON, 2083*
- CROHNS DISEASE
  - REVIEWS, 2574
- DIAGNOSIS
  - ACID SECRETION, 2239
  - BIOPSY, 2242
  - PEPSIN SECRETION, 2239
  - TECHNIQUES, 2286
- DISEASES
  - MITOSIS, 2373
- DISEASES ASSOCIATED WITH
  - DIABETES, 2368
  - SYPHILIS, 2361
- ELECTROLYTE SECRETION
  - GLUCAGON, 2092, 2097
- ELECTROPHYSIOLOGY
  - SHOCK, 2055*
- ENDOCRINE SYSTEM
  - AMINO ACIDS, 1971*
- ENDOSCOPY, 2388
- FOREIGN BODIES
  - DISEASES ASSOCIATED WITH, 2404
  - SURGERY, 2393
- FUNGUS
  - INFECTION, 2385
- GALLBLADDER
  - FISTULA, 2875
- GLYCOLIPIDS
  - CHEMICAL COMPOSITION, 1984
- HYPERPLASIA
  - CHLORINATED HYDROCARBONS, 2353
- INTRINSIC FACTOR
  - DIABETES, 2398
- ION TRANSFER
  - SHOCK, 2055*
- ION TRANSPORT
  - ASPIRIN, 2001*
- METAPLASIA
  - BLOOD GROUPS, 2396
- MORPHOLOGY
  - AMINO ACIDS, 1971*
  - ASPIRIN, 1976*
  - DRUG EFFECTS ON, 1997
- MOTILITY
  - ACIDITY, 2415*
  - ADRENERGIC BLOCKING AGENTS, 2066
  - AMINO ACIDS, 2043*
  - ANESTHESIA, 2064
  - CALCIUM, 2057
  - CHILDREN, 2064
  - DIABETES, 2368
  - DRUG EFFECTS ON, 2062, 2461
  - ELECTROLYTE, 2272
  - ESOPHAGITIS, REFLUX, 2048*
  - INHIBITION, 2095
  - PRESSURE STUDIES, 2048*
  - RADIOLOGY, 2272
  - RADIOTELEMETRY, 2056
  - SODIUM, 2057
  - SURGERY, 2066
- MUCOSA
  - ADENOSINE TRIPHOSPHATASE, 2074*
  - INJURY, 2103
- MUCUS
  - PHYSICAL PROPERTIES, 1972*
- NEOPLASMS, BENIGN, 2357, 2359, 2395
  - PEPTIC ULCER, 2367
  - REVIEWS, 2399
- NEOPLASMS, MALIGNANT, 2354, 2374
  - BURNS, 2376
  - CHEMOTHERAPY, 2378
  - COMPLICATIONS, 2362
  - DIAGNOSIS, 2269
  - DISEASES ASSOCIATED WITH, 2366, 2402
  - ENDOSCOPY, 2383
  - EPIDEMIOLOGY, 2379
  - LYMPHATICS, 2344*
  - PORTAL HYPERTENSION, 2397
  - RADIOLOGY, 2241
  - RADIOTHERAPY, 2365, 2378
  - RECURRENCE, 2352
  - SEQUELAE, 2370
  - STAINING TECHNIQUES, 2269
- NERVOUS SYSTEM
  - GASTRIN, 2085*
  - MOTILITY, 1996
- PARIETAL CELL
  - RADIATION, 2401
  - ULTRASTRUCTURE, 1974*
- PEPSIN SECRETION
  - ALCOHOL, 2081*
  - ASPIRIN, 2081*
  - CATECHOLAMINES, 2076*
  - ENDOCRINE SYSTEM, 2076*
  - HORMONE EFFECTS ON, 2076*
- PERISTALSIS
  - DRUG EFFECTS ON, 2068
- PROTEASE
  - ELECTROPHORESIS, 2102
- PROTEIN
  - DEFICIENCY, 1985
- RADIATION
  - SUCRASE, 2405
- RADIOLOGY, 2369
- RUPTURE, 2392
  - ENDOSCOPY, 2391
- SARCOIDOSIS
  - SURGERY, 2377
- SECRETION
  - ACIDITY, 2207
  - CALCIUM, 2086*
  - CHOLECYSTOKININ, 2089*
  - DIAGNOSIS, 2237
  - DRUG EFFECTS ON, 2355
  - ELECTROLYTE, 2286
  - ENTEROGASTRONE, 2089*
  - GASTRIN, 2089*, 2090*
  - HISTAMINE, 2089*
  - HORMONE EFFECTS ON, 2086*
  - IMMUNOGLOBULINS, 2364
  - INHIBITION, 2095
  - NICOTINE, 2100
  - PARATHYROID GLAND, 2086*
  - PEPTIC ULCER, 2463
  - PEPTIDES, 2111*
  - RADIATION, 2400
  - REVIEWS, 2096
  - SECRETIN, 2089*
  - TECHNIQUES, 2237, 2239
  - VASOCONSTRICTORS, 1991

    STAINING TECHNIQUES, 1975*
    STASIS
        ETIOLOGY, 2059
        PYROGEN, 2059
    STENOSIS
        BURNS, 2372
    SURGERY
        SEQUELAE, 2358
        TECHNIQUES, 2348, 2371
    ULCER
        DISEASES ASSOCIATED WITH, 2481
        ETIOLOGY, 2492
        RADIOLOGY, 2301
        REVIEWS, 2494
        SURGERY, 2418, 2481, 2497, 2499
    VOLVULUS, 2356, 2360
        HERNIA, HIATUS, 2375

STOMACH ULCER
    SEE ALSO PEPTIC ULCER

STRANGULATION
    INTESTINE
        BACTERIA, 2506*

STRESS
    PEPTIC ULCER
        ADRENERGIC BLOCKING AGENTS, 2422
        ETIOLOGY, 2411*, 2416*, 2442, 2476

STRICTURE
    ESOPHAGUS, 2324
        SURGERY, 2311*, 2328

SUCRASE
    STOMACH
        RADIATION, 2405

SUGAR
    INTESTINE
        ABSORPTION, 2035
    JEJUNUM
        ABSORPTION, 2019*
    SMALL INTESTINE
        ABSORPTION, 2007*, 2039

SULFOBROMOPHTHALEIN
    HEPATITIS, VIRAL, 2798
    LIVER DISEASE, ALCHOLOIC
        DIAGNOSIS, 2300

SURGERY
    ACID SECRETION
        PEPTIC ULCER, 2407*, 2409*, 2414*
    ANORECTUM
        ANOMALY, 2288
    AORTA
        COMPLICATIONS, 2629
    BILE ACIDS
        MALABSORPTION, 2592
    BILIARY TRACT
        PANCREATITIS, 2713
        SEQUELAE, 2713
    CARCINOIDS
        RECTUM, 2609*
    CHOLEDOCHOLITHIASIS, 2861
    COLON
        DIVERTICULUM, 2658
        ISCHEMIA, 2629
        SEQUELAE, 2632
        TRAUMA, 2623
    DUODENUM
        DIVERTICULUM, 2538
        FOREIGN BODIES, 2393
        NEOPLASMS, 2562
        ULCER, 2419, 2426, 2484, 2495, 2500
    ESOPHAGITIS, 2313*
    ESOPHAGUS, 2315*, 2332, 2338
        ANOMALY, CONGENITAL, 2326, 2330, 2334
        NEOPLASMS, MALIGNANT, 2341
        SEQUELAE, 2633
        STRICTURE, 2311*, 2328
    HERNIA, HIATUS, 2315*, 2328, 2343
        MOTILITY, 2312*
        REFLUX, 2312*
    ILEUM
        BILE ACIDS, 2741
        CHOLESTEROL, 2025*
        MALABSORPTION, 2592
        SEQUELAE, 2560
    ILEUS, 2554
    INTESTINE
        MOTILITY, 2515
    LARGE INTESTINE
        CROHNS DISEASE, 2676*
        FISTULA, 2649
        NEOPLASMS, 2621
        NEOPLASMS, MALIGNANT, 2654
        POLYPS, 2666
    LIVER
        NEOPLASMS, MALIGNANT, 2759
        TRAUMA, 2735, 2747, 2756, 2757, 2839
    LIVER DISEASE, 2764
    MEGACOLON
        TECHNIQUES, 2644
    PANCREAS
        CYSTS, 2717
    PANCREATIC DUCT
        CALCULI, 2689
    PANCREATITIS
        BLEEDING, 2707*
    PEPTIC ULCER, 2094, 2427
        ACID SECRETION, 2472
        AGE FACTORS, 2410*, 2450
        DRUG TREATMENT, 2430
        GLUCOSE INTOLERANCE, 2447
        PANCREAS FUNCTION TESTS, 2475
        PANCREATIC FUNCTION TESTS, 2462
        PERFORATION, 2423, 2457
        SEQUELAE, 2448, 2464, 2466, 2496
        SMALL INTESTINE, 2502
        TECHNIQUES, 2443, 2474, 2477
        THERAPY, 2417
        VAGOTOMY, 2444
    RECTUM
        PROLAPSE, 2664
    REGIONAL ENTERITIS
        IMMUNOGLOBULINS, 2677*
        LARGE INTESTINE, 2681
        SEQUELAE, 2575
    SEQUELAE
        CROHNS DISEASE, 2608*
        JAUNDICE, 2767
    SHUNT
        CIRRHOSIS, 2844

    - LIVER, 2839
    - PORTAL HYPERTENSION, 2842, 2843
  - SMALL INTESTINE
    - ABSORPTION, 2039
    - ACID SECRETION, 2087*
    - ANEMIA, PERNICIOUS, 2597
    - FISTULA, 2546
    - MALABSORPTION, 2591
    - MOTILITY, 2060
    - TECHNIQUES, 2223
  - STOMACH
    - ANOMALY, CONGENITAL, 2907
    - FOREIGN BODIES, 2393
    - MOTILITY, 2066
    - SARCOIDOSIS, 2377
    - SEQUELAE, 2358
    - TECHNIQUES, 2348, 2371
    - ULCER, 2418, 2481, 2497, 2499
  - ULCERATIVE COLITIS, 2676*, 2681
    - IMMUNOGLOBULINS, 2677*
    - SURVIVAL, 2675*

- SURVIVAL
  - CHOLECYSTECTOMY, 2865
  - CIRRHOSIS
    - BLEEDING, 2836
  - GASTRECTOMY
    - SEQUELAE, 2380
  - LARGE INTESTINE
    - NEOPLASMS, MALIGNANT, 2663
  - PERITONITIS
    - CONTRAST MEDIA, 2221
  - SALIVARY GLANDS
    - NEOPLASMS, MALIGNANT, 2899
  - ULCERATIVE COLITIS
    - SURGERY, 2675*

- SYPHILIS
  - STOMACH
    - DISEASES ASSOCIATED WITH, 2361

- TEMPERATURE
  - LIVER
    - ION TRANSPORT, 2030
    - TRANSPLANTATION, 2138

- THERAPY
  - SEE ALSO SPECIFIC THERAPEUTIC METHODS AND AGENTS
  - CHOLEDOCHOLITHIASIS, 2867
  - COLITIS, 2650
  - COLOSTOMY
    - PSYCHOLOGICAL FACTORS, 2652
  - CONSTIPATION, 2926
  - ENZYME
    - CYSTIC FIBROSIS, 2703
  - ESOPHAGUS
    - VARICES, 2827*
  - GASTROENTERITIS
    - NEONATE, 2916
  - HELMINTHIASIS
    - ANEMIA, 2952
  - HEPATITIS, VIRAL
    - COMA, 2782*
  - HERNIA, HIATUS, 2320
  - ILEOSTOMY
    - PSYCHOLOGICAL FACTORS, 2652
  - ILEUS, 2904
  - LIVER
    - HEMATOMA, 2736
  - OMPHALOCELES, 2907
  - PANCREAS
    - PSEUDOCYST, 2711
    - SECRETION, 2703
  - PANCREATITIS, 2720
    - SECRETIN, 2709*
  - PEPTIC ULCER
    - PHYSICAL FACTORS, 2490
    - SURGERY, 2417
  - REGIONAL ENTERITIS
    - ANUS, 2643
    - LARGE INTESTINE, 2671
  - SIGMOID
    - VOLVULUS, 2673
  - SMALL INTESTINE
    - FISTULA, 2536
    - OBSTRUCTION, 2520
  - UREMIA
    - BILE ACIDS, 2008*

- TISSUE CULTURE
  - LIVER
    - ALKALOIDS, 2187

- TOXICITY
  - PEPTIDES
    - HEPATECTOMY, 2186

- TOXOPLASMOSIS
  - HEPATITIS
    - EPIDEMIOLOGY, 2772

- TRACE ELEMENT
  - CHOLELITHIASIS
    - CHEMICAL COMPOSITION, 2858
  - GALLBLADDER
    - CHEMICAL COMPOSITION, 2858

- TRANSFUSION
  - PERFORATION
    - CECUM, 2653
  - SMALL INTESTINE
    - METABOLISM, 2512

- TRANSPLANTATION
  - INTESTINE
    - ABSORPTION, 2220
    - IMMUNOSUPPRESSION, 2220
  - KIDNEY
    - PANCREATITIS, 2706*
  - LIVER, 2153
    - CIRCULATION, 2138
    - IMMUNOLOGY, 2156, 2170
    - IMMUNOSUPPRESSION, 2164, 2165
    - LIVER INJURY, 2164
    - PERFUSION, 2171
    - REVIEWS, 2749
    - SHUNT, 2164
    - TECHNIQUES, 2154
    - TEMPERATURE, 2138
  - LIVER INJURY
    - IMMUNOLOGY, 2200
  - SMALL INTESTINE, 2555
    - IMMUNOLOGY, 1990
    - MORPHOLOGY, 1990
    - TECHNIQUES, 2218

- TRANSPORT

- ELECTROLYTE
  - ILEUM, 2509*

TRAUMA
- ABDOMEN, 2547, 2908
- COLON
  - SURGERY, 2623
- DUODENUM
  - RUPTURE, 2532
- GALLBLADDER, 2878
- LARGE INTESTINE
  - FOREIGN BODIES, 2618
  - PHYSICAL FACTORS, 2630
- LIVER
  - SURGERY, 2735, 2747, 2756, 2757, 2839
- PANCREAS, 2692
  - REVIEWS, 2696
- SMALL INTESTINE, 2547, 2566
  - FOREIGN BODIES, 2618

TREATMENT
- SEE THERAPY

TRIGLYCERIDE
- METABOLISM
  - ANTICOAGULANTS, 2818
  - FATTY LIVER, 2818
  - GLUCOSE, 2818

TRYPANOSOMIASIS
- MEGACOLON
  - ETIOLOGY, 2644

TRYPSIN
- PANCREAS
  - DIAGNOSIS, 2245

TUBERCULOSIS
- CECUM
  - COMPLICATIONS, 2535
- ILEUM
  - COMPLICATIONS, 2535
- INTESTINE
  - PERFORATION, 2527
- PERITONITIS, 2935

ULCER
- ANUS
  - REGIONAL ENTERITIS, 2579
- CECUM
  - BLEEDING, 2619
- DUODENUM, 2449
  - ANTRECTOMY, 2424, 2425
  - DRUG TREATMENT, 2434
  - GASTRIN, 2412*
  - GLUCOSE TOLERANCE, 2452
  - INSULIN, 2452
  - MOTILITY, 2415*
  - PAIN, 2501
  - PERFORATION, 2423
  - PYLOROPLASTY, 2424
  - SURGERY, 2419, 2426, 2484, 2495, 2500
  - VAGOTOMY, 2425, 2467, 2487
- LARGE INTESTINE
  - DISEASES ASSOCIATED WITH, 2645
- MECKELS DIVERTICULUM
  - BLEEDING, 2514
- RECTUM
  - BLEEDING, 2667
- STOMACH
  - DISEASES ASSOCIATED WITH, 2481
  - ETIOLOGY, 2492
  - RADIOLOGY, 2301
  - REVIEWS, 2494
  - SURGERY, 2418, 2481, 2497, 2499

ULCERATIVE COLITIS
- SEE ALSO COLITIS
- COLON
  - NEOPLASMS, MALIGNANT, 2680
- DIAGNOSIS, 2684
- DISEASES ASSOCIATED WITH
  - IMMUNOLOGY, 2880*
  - NEOPLASMS, MALIGNANT, 2680
- EPIDEMIOLOGY, 2678*, 2679*
- PSYCHOLOGICAL FACTORS, 2611*
- REVIEWS, 2683
- SEQUELAE
  - MEGACOLON, 2682
- SURGERY, 2676*, 2681
  - IMMUNOGLOBULINS, 2677*
  - SURVIVAL, 2675*

ULTRASTRUCTURE
- ESOPHAGUS
  - AGE FACTORS, 2000
  - EMBRYOLOGY, 2000
- GALLBLADDER
  - ION TRANSPORT, 2135
- ILEUM
  - ION TRANSPORT, 2135
- LIVER, 1993
  - ACYLTRANSFERASE, 1980*
  - ALCOHOL, 1978*
  - CIRRHOSIS, 2828*
  - GLYCOSIDES, 2143
  - LIVER DISEASE, ALCOHOLIC, 2820
  - PREGNANCY, 2194
  - REJECTION, 2153
  - STEROIDS, 2194
- PANCREAS, 1993
  - PERFUSION, 2116*
- SMALL INTESTINE
  - ALBUMIN, 1977*
  - ENZYMES, 2201*
  - WHIPPLES DISEASE, 2545
- STOMACH
  - PARIETAL CELL, 1974*

UREMIA
- CALCIUM
  - ABSORPTION, 2032
- GASTROINTESTINAL
  - MUCOSA, 2519
- THERAPY
  - BILE ACIDS, 2008*

UROGENITAL SYSTEM
- PEPTIC ULCER
  - DISEASES ASSOCIATED WITH, 2441

VAGOTOMY
- BILE
  - SECRETION, 2125*

    DIARRHEA
        DRUG TREATMENT, 2465
    DUODENUM
        ULCER, 2425, 2467, 2487
    ESOPHAGUS
        MOTILITY, 2041*
    PEPTIC ULCER
        SURGERY, 2444
        TECHNIQUES, 2451, 2471, 2482
    SEQUELAE
        DRUG TREATMENT, 2489
        OBSTRUCTION, 2486

VARICES
    ESOPHAGUS
        BLEEDING, 2827*
        CIRRHOSIS, 2832
        THERAPY, 2827*

VASOCONSTRICTORS
    STOMACH
        SECRETION, 1991

VASOPRESSIN
    GASTROINTESTINAL
        BLEEDING, 2883*
    PANCREAS
        SECRETION, 2110*
    PANCREATITIS
        CIRCULATION, 2211*

VILLI
    SMALL INTESTINE
        BACTERIA, 1989

VIRUS
    GASTROENTERITIS
        ETIOLOGY, 2882*

VITAMIN B12
    MALABSORPTION
        ASPIRIN, 2583*
    SMALL INTESTINE
        ABSORPTION, 2014*
    ABSORPTION
        SMALL INTESTINE, 2511*, 2597
    MALABSORPTION
        CIRRHOSIS, 2600
        HEPATITIS, CHRONIC, 2600

VITAMIN D
    CALCIUM
        ABSORPTION, 2037
    JAUNDICE, OBSTRUCTIVE
        NEONATE, 2852*
    MALABSORPTION
        DISEASES ASSOCIATED WITH, 2599

VITAMIN E
    ABSORPTION, 2016*
        DIETARY FACTORS, 2017*
    DEFICIENCY
        ABSORPTION, 2017*

VOLVULUS
    LARGE INTESTINE, 2638
        FAMILIAL FACTORS, 2617
    SIGMOID, 2626
        THERAPY, 2673
    STOMACH, 2356, 2360
        HERNIA, HIATUS, 2375

VOMITING
    DEHYDRATION
        ALKALOSIS, 2915
    DRUG TREATMENT
        REVIEWS, 2929
    DUODENUM
        ELECTROPHYSIOLOGY, 2047*
    HERNIA, HIATUS
        ETIOLOGY, 2314*
    PSYCHOLOGICAL FACTORS, 2938
    STOMACH
        ACID SECRETION, 2266

WATER
    ABSORPTION
        CELIAC DISEASE, 2585*
        CIRCULATION, 2021*
        JEJUNUM, 2021*

WATER TRANSPORT
    SMALL INTESTINE
        HORMONE, 2022*

WHIPPLES DISEASE
    IMMUNOLOGY
        ANTIBIOTICS, 2588*
    SMALL INTESTINE
        MORPHOLOGY, 2545
        ULTRASTRUCTURE, 2545

XANTHINE OXIDASE
    LIVER DISEASE
        DIAGNOSIS, 2277

XYLOSE
    ABSORPTION
        DIABETES, 2595

ZOLLINGER-ELLISON SYNDROME, 2909
    BLOOD
        CALCIUM, 2881*
    DIAGNOSIS
        GASTRIN, 2287
    DISEASES ASSOCIATED WITH
        PARATHYROID GLAND, 2881*
    GASTRIN, 2255
    STOMACH
        ACID SECRETION, 2284, 2913

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ABSTRACTS
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NATIONAL INSTITUTE OF ARTHRITIS, METABOLISM, AND DIGESTIVE DISEASES

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PREFACE

GASTROENTEROLOGY ABSTRACTS and CITATIONS is a publication of the National Institute of Arthritis, Metabolism and Digestive Diseases. This specialized information medium has been initiated to fill an existing great need in the field of gastroenterology and to assist the Institute in meeting its obligations to foster and support laboratory and clinical research into the nature, causes, and therapy of diseases of the gastrointestinal tract. Publication GASTROENTEROLOGY ABSTRACTS and CITATIONS makes available citations of all current papers relevant to this field from medical journals published throughout the world. Approximately one-third of the citations dealing with the major aspects of gastroenterology have accompanying abstracts.

The issuing of GASTROENTEROLOGY ABSTRACTS and CITATIONS under the auspices of the National Institute of Arthritis, Metabolism, and Digestive Diseases will provide a much needed current awareness tool to scientists and will facilitate greater integration of research and clinical efforts in this field. The number and great diversity of publications in the area of gastroenterology makes it imperative that an appropriate service be available to investigators and practitioners so that they may be apprised of progress with a minimum of delay. Our aim is to provide the readers with a readily systematized complilation of current published work. The publication will provide the greatest usefulness if these interested investigators will contribute their ideas and comments for consideration whenever possible.

GASTROENTEROLOGY ABSTRACTS and CITATIONS is published monthly and includes citations and abstracts from the biomedical world literature as they are currently received. Volume 7 will appear in, and be dated, 1973. There will be no hiatus in literature coverage from Volume 6 which was dated 1971. In addition, yearly cumulated subject and author indexes are published.

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CONTENTS

Abstracts, Citations — Page

PRE-CLINICAL SCIENCES

Morphology, Cellular Structure and Histochemistry . . . 2964-3000 267
Absorption--Excretion--Transport. 3001-3037 269
Motility. 3038-3069 274

Secretion and Metabolism . . . .

  Stomach. 3070-3115 277
  Pancreas 3116-3131 282
  Hepatobiliary Tract. 3132-3188 284
  Intestine. 3189-3213 288
General 3214-3231 292

DIAGNOSTIC PROCEDURES. 3232-3318 295

GASTROINTESTINAL DISEASES

Esophagus 3319-3355 303
Stomach 3356-3378 305
  Peptic Ulcers. 3379-3429 307
Small Intestine 3430-3482 312
  Regional Enteritis 3483-3499 316
  Malabsorption. 3500-3539 318
Large Intestine 3540-3604 322
  Ulcerative Colitis 3605-3619 326
Pancreas. 3620-3645 328
  Pancreatitis 3646-3670 330
Liver and Biliary Tract 3671-3700 333
  Hyperbilirubinemic States. 3701-3706 335
  Nonviral Hepatitis and Hepatic Injury. 3707-3727 335
  Acute Viral Hepatitis. 3728-3761 337
  Chronic Hepatitis. 3762-3778 340
  Alcoholic Liver Disease. 3779-3792 341
  Cirrhosis. 3793-3807 342
  Gallbladder and Biliary Tract Diseases 3808-3834 343

General 3835-3902 345
  Parasitology 3903-3923 349

AUTHOR INDEX

SUBJECT INDEX

The Secretary of the Department of Health, Education, and Welfare has determined that the publication of this periodical is necessary in the transaction of the public business required by law of this Department. Use of funds for printing this periodical has been approved by the Director of the Office of Management and Budget through April 30, 1975.

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NOTE

Journal names are abbreviated according to the list of abbreviations used by *Index Medicus*. For journals not covered by *Index Medicus*, the abbreviations (with some modifications) found in *World Medical Periodicals*, 3rd Edition, are used.

LANGUAGE ABBREVIATIONS

Afr.	Afrikaans
Ar.	Arabic
Bul.	Bulgarian
Ch.	Chinese
Cz.	Czech
Dan.	Danish
Dut.	Dutch
E.	English
Eston.	Estonian
Fin.	Finnish
Fl.	Flemish
Fr.	French
Ger.	German
Gr.	Greek
Heb.	Hebrew
Hun.	Hungarian
Ic.	Icelandic
In.	Indonesian
It.	Italian
Jap.	Japanese
Kor.	Korean
Latv.	Latvian
Lith.	Lithuanian
Nor.	Norwegian
Pol.	Polish
Por.	Portuguese
Rum.	Rumanian
Rus.	Russian
Ser.	Serbo-Croatian
Sl.	Slovak
Sp.	Spanish
Sw.	Swedish
Th.	Thai
Turk.	Turkish
Uk.	Ukrainian
Viet.	Vietnamese

ABBREVIATIONS USED IN ABSTRACTS

ACTH	adrenocorticotropic hormone
ADP	adenosine diphosphate
AMP	adenosine monophosphate
ATP	adenosine triphosphate
BSP	sulfobromophthalein
C	degrees centigrade
cm	centimeter(s)
CNS	central nervous system
cpm	counts per minute
DNA	deoxyribonucleic acid
e.g.	for example
g	gram(s)
μg	microgram(s)
hr	hour(s)
i.m.	intramuscular
i.p.	intraperitoneal
IU	international unit(s)
i.v.	intravenous
kg	kilogram(s)
LD_{50}	median lethal dose(s)
LDH	lactic acid dehydrogenase
m	meter(s)
M	molar
mEq	milliequivalent(s)
mM	millimolar
μM	micromolar
mC,μC	milli-,microcurie(s)
mg	milligram(s)
min	minute(s)
ml	milliliter(s)
mm	millimeter(s)
MTD	maximum tolerated dose
ng	nanogram (10^{-9})
pg	picogram (10^{-12})
p.o.	orally
ppm	parts per million
r	Roentgen
RBC	red blood cells (erythrocytes), red blood count
resp.	respectively
Rev.	review (only in citations)
RNA	ribonucleic acid
s.c.	subcutaneous
sec	second(s)
SGOT	serum glutamic-oxalacetic transaminase
SGPT	serum glutamic-pyruvic transaminase
U	unit(s)
UV	ultraviolet
WBC	white blood cells (leukocytes), white blood count
yr	year(s)

PRE-CLINICAL SCIENCES

MORPHOLOGY, CELLULAR STRUCTURE AND HISTOCHEMISTRY

2964 THE GASTRIC GLANDS OF THE RAT AFTER STIMULATION WITH PENTAGASTRIN, HISTALOG, AND IN ACUTE STRESS: A COMPARATIVE FINE STRUCTURAL STUDY. *(E.)* Hubner, G.; Klein, H. J.; Eder, M. (Dept. Pathol., Univ. Cologne, Germany). *Acta Hepatogastroenterol.* 19(5):388-394, 1972.

Ultrastructural investigation of the rat stomach shows that its fine structure undergoes no significant changes when stimulated with pentagastrin. In contrast, an application of betazole causes an increased capillary permeability with interstitial edema, diapedesis of erythrocytes, and dehiscence of surface epithelia. This may lead to formation of erosions and of ulcers due to the peptic action of the gastric juice. Application of total restraint, inducing acute stress, leads to an apparently counter-regulatory cholinergic phase preceded by a 3 hr sympatho-adrenergic phase with a well marked contraction of the arterioles, often resulting in almost complete occlusion of the vessels. Small quantities of highly concentrated HCl are then produced, which lead to the formation of erosions and superficial ulcers after 6 hr, particularly as the stomach shows in this stage a well marked contraction and as the mucosa is already damaged by ischemia.

2965 EFFECT OF PENTAGASTRIN ON GASTRIC MUCOSAL CELLS GROWN IN TISSUE CULTURE. *(E.)* Miller, L. R.; Jacobson, E. D.; Johnson, L. R. (Univ. Oklahoma Health Sci. Ctr., Oklahoma City). *Gastroenterology* 64(2):254-267, 1973.

Primary explants of rat and human gastric mucosa from the oxyntic gland region were cultured in T flasks. The cultures were not disturbed until outgrowth of fibroblasts and epithelial cells had occurred. This latent period lasted approximately 7 days. Either pentagastrin (up to 0.5 μg/ml) or an equal volume of saline was then added daily to the cultures and subsequent subcultures. Control (saline) cultures showed rapid growth of fibroblasts and ultimate loss of epithelial cells. Fibroblast outgrowth was inhibited and epithelial cell proliferation was stimulated in the cultures incubated with pentagastrin. At confluence the mitotic index of subcultures treated with pentagastrin was more than twice that of the control cultures. Total protein of subcultures incubated with pentagastrin was twice that of saline-treated subcultures which had been started with an equal amount of inoculum and otherwise identical to the pentagastrin-treated flasks. Electron microscopic observation revealed a primitive epithelial populace in the pentagastrin-treated cultures with a composite of anatomical features seen in differentiated gastric mucosal cell flora, including the presence of cytoplasmic and perinuclear Golgi zones, profiles of rough endoplasmic reticulum, and elongated and round mitochondria. The results imply that gastrin has a direct effect on gastric mucosal epithelial cell growth and division but does not produce an epitheloid change in fibroblasts. No discernable difference was found between rat and human cultures.

2966 DEVELOPMENT OF BILE CANALICULI IN THE FETAL RAT LIVER IN CELL CULTURES IN THE PRESENCE OF GLUCOCORTICOIDS. *(Fr.)* Lambiotte, M.; Vorbrodt, A.; Benedetti, E. L. (Inst. Molecular Biol., Fac. Sci., Paris, France). *C. R. Acad. Sci. Paris* 275(22):2539-2542, 1972.

2967 DUODENAL AND UPPER JEJUNAL EPITHELIAL TURNOVER IN SUCKLING RATS. *(E.)* Toccalino, H.; Iovannitti, C.; Garcia Cardo, A.; Licastro, R.; Williams, M. (Alejandro Posadas Polyclin., Natl. Inst. Health, Haedo, Argentina). *Acta Gastroenterol. Latinoam.* 4(2):85-89, 1972.

2968 IMMUNOFLUORESCENCE STUDIES ON THE G CELLS IN NORMAL AND ABNORMAL GASTRIC MUCOSA. *(E.)* Pearse, A. G. E.; Bussolati, G.; Polak, J. (Hammersmith Hosp., London, England). *Acta Hepatogastroenterol.* 19(4):291-295, 1972.

2969 STIMULATING EFFECT OF GASTRIN ON CELL PROLIFERATION KINETICS IN CANINE FUNDIC MUCOSA. *(E.)* Willems, G.; Vansteenkiste, Y.; Limbosch, J. M. (St. Pierre Hosp., Brussels, Belgium). *Gastroenterology* 62(4):583-589, 1972.

2970 AUTOPHAGY IN ACUTE LIVER DAMAGE PRODUCED IN THE RAT BY DIMETHYLNITROSAMINE. *(E.)* Hendy, R.; Grasso, P. (British Indus. Biol. Res. Assoc., Carshalton, England). *Chem. Biol. Interact.* 5(6):401-413, 1972.

2971 CAUSES OF THE ZONAL DISTRIBUTION OF GLYCOGEN IN THE LIVER ACINUS AFTER A FAT-RICH DIET. I. GLYCOGEN DEPOSITION IN ACINI OF RAT LIVERS DURING "NORMAL" AND "REVERSED" PERFUSION. *(E.)* Den Otter, W.; Tuit, G. (Dept. Pathol., State Univ., Utrecht, Netherlands). *Anat. Rec.* 173(3):325-332, 1972.

2972 EFFECT OF EXCESS AND DEFICIENCY OF INDIVIDUAL ESSENTIAL AMINO ACIDS IN DIETS ON THE LIVER LIPID CONTENT OF GROWING RATS. *(E.)* Aoyama, Y.; Ashida, K. (Dept. Agric. Chem., Nagoya Univ., Chikusa, Japan). *J. Nutr.* 102(8):1025-1032, 1972.

2973 STUDIES ON THE NATURE OF ATTACHMENT OF RIBOSOMES TO MEMBRANES IN LIVER II. INFLUENCE OF MONOVALENT CATIONS ON THE DETACHMENT OF MEMBRANE-BOUND RIBOSOMES FROM MEMBRANES. *(E.)* Sarma, D. S. R.; Verney, E.; Sidransky, H. (Univ.

Pittsburgh, Sch. Med., Pa.). *Lab. Invest.* 27(1): 48-52, 1972.

2974 STUDIES ON THE NATURE OF ATTACHMENT OF RIBOSOMES TO MEMBRANES IN LIVER. I. INFLUENCE OF ETHIONINE, SPARSOMYCIN, CCl_4, AND PUROMYCIN ON DETACHMENT OF MEMBRANE-BOUND RIBOSOMES FROM MEMBRANES. *(E.)* Sarma, D. S. R.; Reid, I. M.; Verney, E.; Sidransky, H. (Univ. Pittsburgh, Sch. Med., Pa.). *Lab. Invest.* 27(1):39-47, 1972.

2975 DISTRIBUTION OF FREE AND MEMBRANE-BOUND RIBOSOMES IN LIVERS OF PROTEIN-CALORIE-DEFICIENT RATS. *(E.)* Enwonwu, C. O. (Nutr. Biochem. Lab., Univ. Washington, Seattle). *Lab. Invest.* 26(6):626-636, 1972.

2976 HYDROXYUREA EFFECTS IN THE C3H MOUSE. I. DUODENAL CRYPT CELL KINETICS. *(E.)* Dethlefsen, L. A.; Riley, R. M. (Univ. Utah Med. Ctr., Salt Lake City). *Cell Tissue Kinet.* 6(1): 3-16, 1973.

2977 AN ESTIMATION OF PROLIFERATIVE POPULATION SIZE IN STOMACH, JEJUNUM AND COLON OF DBA-2 MICE. *(E.)* Kovacs, L.; Potten, C. S. (Christie Hosp., Manchester, England). *Cell Tissue Kinet.* 6(2):125-134, 1973.

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2980 LOCALIZATION BY IMMUNOFLUORESCENE OF SECRETORY COMPONENT AND IgA IN THE INTESTINAL MUCOSA OF THE YOUNG PIG. *(E.)* Allen, W. D.; Porter, P. (Unilever Res. Lab., Sharnbrook, Bedford, England). *Immunology* 24(2):365-374, 1973.

2981 LYMPHOID AGGREGATIONS IN THE OESOPHAGUS OF THE TOAD (BUFO MELANOSTICTUS). *(E.)* Wong, W. C. (Dept. Anat. Univ. Singapore). *Acta Anat.* 83(3):461-467, 1972.

2982 STRUCTURE AND FUNCTIONAL CAPACITY OF THE SMALL INTESTINE IN NORMAL SUBJECTS. *(Fr.)* Mainguet, P. (Univ. Med. Clin., St. Pierre Hosp., Brussels, Belgium). *Acta Gastroenterol. Belg.* 35:117-130, 1972.

2983 CELL REGENERATION AND MORPHOLOGICAL ADAPTATION OF THE REMAINING INTESTINE AFTER EXTENSIVE RESECTION OF THE SMALL INTESTINE. *(Fr.)* Willems, G. (St. Pierre Hosp., Free Univ., Brussels, Belgium). *Acta Gastroenterol. Belg.* 35:216-224, 1972.

2984 RELATION BETWEEN MICROCIRCULATION AND NECROSIS IN RAT LIVER. *(Ger.)* Stefenelli, N., Gericke, A. (1st Med. Clin., Univ. Vienna, Austria). *Acta Hepatogastroenterol.* 19(4):250-255, 1972.

2985 THE DYNAMICS OF HISTOCHEMICAL CHANGES IN THE EPITHELIUM OF THE SMALL INTESTINE OF MICE AFTER EXPERIMENTAL INTRAPERITONEAL INTOXICATION WITH BENZENE. *(E.)* Jonek, J.; Kaminski, M.; Latkowska, H.; Kaminska, O. (Silesian Med. Acad., Zabrze-Rokitnica, Poland). *Acta Histochem.* 44(1): 15-28, 1972.

2986 STUDIES ON THE REACTIVITY OF SMALL INTESTINE TO BARIUM CHLORIDE IN THE COURSE OF POST-IRRADIATION DISEASE IN GUINEA PIG. *(E.)* Wisniewski, K.; Piekarska, T.; Danysz, A. (Med. Acad., Bialystok, Poland). *Acta Physiol. Pol.* 23(1):141-147, 1972.

2987 DISTRIBUTION OF DIAZO-POSITIVE (ARGENTAFFIN) CELLS IN THE SMALL INTESTINE OF RATS OF VARIOUS AGES. *(E.)* Josephson, R. L.; Altmann, G. G. (Health Sci. Ctr., Univ. Western Ontario, London, Canada). *Am. J. Anat.* 136(1): 15-22, 1973.

2988 FIBRINOLYTIC ACTIVITY IN RAT GASTROINTESTINAL MUCOSA. *(E.)* Myhre-Jensen, O.; Baetz, B. A.; Astrup, T. (James F. Mitchell Fdn., Inst. Med. Res., Washington, D.C.). *Arch. Pathol.* 95(3):195-198, 1973.

2989 SMALL INTESTINAL MORPHOLOGY IN CHILDHOOD. *(E.)* Walker-Smith, J. (Roy. Alexandra Hosp, Children, Camperdown, Australia). *Arq. Gastroenterol.* 9(3):119-130, 1972.

2990 THREE COMPONENTS OF GASTRIN IN HUMAN SERUM: GEL FILTRATION STUDIES ON THE MOLECULAR SIZE OF IMMUNOREACTIVE GASTRIN. *(E.)* Rehfeld, J. F. (Bispebjerg Hosp., Copenhagen, Denmark). *Biochim. Biophys. Acta* 285(2):364-372, 1972. 285(2):364(373, 1972.

2991 ON THE PREPARATION AND SOME PROPERTIES OF CLOSED MEMBRANE VESICLES FROM HOG DUODENAL AND JEJUNAL BRUSH BORDER. *(E.)* Louvard, D.; Maroux, S.; Baratti, J.; Desnuelle, P.; Mutaftschiev, S. (Inst. Biochem. Molecular Biol., Natl. Ctr. Sci.

Res., Marseille, France). *Biochim. Biophys. Acta* 291(3):747-763, 1973.

2992 PURIFICATION OF A HUMAN URINARY GLYCOPROTEIN WITH GASTRIC ANTISECRETORY ACTIVITY. *(E.)* Carrea, G.; Casellato, M. M.; Manera, E.; Pasta, P.; Lugaro, G. (Lab. Hormone Chem., C.N.R., Milan, Italy). *Biochim. Biophys. Acta* 295(1):274-282, 1973.

2993 INTRAACINAR NERVE ENDINGS IN THE PAROTID GLAND OF THE RAT. *(Ger.)* Strakele, H. (Inst. Histol., Embryol., Med. Fac., Comenius Univ., Bratislava, Czechoslovakia). *Biologia (Bratislava)* 27(12):939-943, 1972.

2994 EFFECT OF HYDROCORTISONE ON TEMPORAL PARAMETERS OF THE MITOTIC CYCLE OF EPITHELIAL CELLS IN THE DUODENUM. *(Rus.)* Laguchev, S. S.; Avetisian, A. A. (Inst. Med. Genetics, Moscow, USSR). *Biull. Eksp. Biol. Med.* 73(6):86-88, 1972.

2995 AUTONOMIC PLEXUSES IN THE SMALL INTESTINE OF DOG. *(E.)* Chowdhary, S. C.; Chaturvedi, R. P.; Mehta, L. (S.M.S. Med. Coll., Jaipur, India). *Indian J. Med. Res.* 60(9):1393-1396, 1972.

2996 INTERMEDIATE CELLS OF THE PANCREAS. I. ULTRASTRUCTURAL CHARACTERIZATION. *(E.)* Melmed, R. N.; Benitez, C. J.; Holt, S. J. (Middlesex Hosp. Med. Sch., London, England). *J. Cell Sci.* 11(2):449-475, 1972.

2997 FREEZE-FRACTURE REPLICATION OF ROUGH ENDOPLASMIC RETICULUM OF MOUSE LIVER CELLS. *(E.)* Breathnach, A. S.; Stolinski, C.; Gross, M. (St. Mary's Hosp. Med. Sch., London, England). *J. Cell Sci.* 11(2):477-489, 1972.

2998 MORPHOLOGIC AND BIOCHEMICAL CHANGES IN THE GUT AFTER CHRONIC TREATMENT WITH L-DOPA. *(E.)* Rivera-Calimlim, L.; Bosmann, H. B.; Penney, D. P.; Lasagna, L. (Univ. Rochester Sch. Med. Dentistry, N.Y.). *J. Pharmacol. Exp. Ther.* 184(2):440-448, 1973.

2999 CHARACTERISTICS OF NONEPITHELIAL CELLS IN THE EPITHELIUM OF NORMAL RAT ILEUM: A LIGHT AND ELECTRON MICROSCOPICAL STUDY. *(E.)* Collan, Y. (2nd Dept. Pathol., Univ. Helsinki, Finland). *Scand. J. Gastroenterol.* 7(suppl. 18): 1-66, 1972.

3000 THE LENGTH AND NUMBER OF PRECAPILLARY ANASTOMOSES IN THE HUMAN LIVER. *(Ger.)* Feigl, W.; Sinzinger, H.; Reisinger, L. (Inst. Pathol. Anat., Univ. Vienna, Austria). *Z. Anat. Entwicklungsgesch.* 138(1):34-40, 1972.

See also 3079, 3139, 3161, 3171, 3213, 3226, 3463.

ABSORPTION—EXCRETION—TRANSPORT

3001 THE UPTAKE OF PTEROYLGLUTAMIC ACID BY THE RAT JEJUNUM. *(E.)* Smith, M. E. (Dept. Physiol., Univ. Birmingham, England). *Biochim. Biophys. Acta* 298(1):124-129, 1973.

The uptake of pteroylglutamic acid (folic acid) from the lumen of the rat jejunum was studied with the everted sac technique and ^{3}H-pteroylglutamic acid. Transport into the serosal solution and uptake into the tissues were determined separately. The rate of uptake of pteroylglutamic acid was studied over a concentration range of 1×10^{-8}-1×10^{-7} M. A rate-limiting process appears involved in uptake of this vitamin into the tissues, but transport into the serosal solution was proportional to concentration. The tissues accumulated pteroylglutamic acid with respect to the incubating solutions at concentrations of 1×10^{-7} M and below when sacs were incubated for 1 hr at 37° C. This accumulation was seen when pteroylglutamic acid was present initially on the mucosal side only, and when it was present on both sides of the intestine with no initial concentration gradient between the mucosal and serosal solutions. In the latter case pteroylglutamic acid was removed preferentially from the mucosal solution although some uptake from ther serosal solution occurred. When pteroylglutamic acid was present on the mucosal side at 1×10^{-8} M, uptake was depressed 46% by 5×10^{-4} M 4-amino-10-methylpteroylglutamic acid. With 4.5×10^{-9} M pteroylglutamic acid, 68% inhibition was caused by 1×10^{-3} M NaF. It is suggested that the process whereby pteroylglutamic acid is accumulated in the tissues is not apparent at 1×10^{-6} M and higher concentrations because of the greater contribution by passive diffusion and solvent drag to its total transport. Transport of pteroylglutamic acid into the serosal solution may be independent of the special uptake process described.

3002 THE MEASUREMENT OF BIDIRECTIONAL SODIUM FLUXES ACROSS THE INTESTINAL WALL IN MAN USING WHOLE GUT PERFUSION. *(E.)* Love, A. H. G.; Rohde, J. E.; Abrams, M. E.; Veall, N. (Dept. Med., Queen's Univ. Belfast, Northern Ireland). *Clin. Sci.* 44(3):267-278, 1973.

Double-tracer studies were conducted to investigate the validity of a whole-gut perfusion technique for measuring gut lumen-to-plasma and plasma-to-gut lumen sodium fluxes in man. The use of 2 tracers permits differentiation between the nonabsorbed p.o. administered sodium in the stools and the sodium which has been absorbed and resected; the latter may amount to about 30% of the recovered material. Data do not permit calculation of the absolute values of the bidirectional fluxes without assuming the sodium, which crosses from the plasma to the gut lumen, is absorbed by the gut to the same extent as the p.o. administered material. Analysis of the kinetics of sodium transfer from mouth to stool direct and via the blood plasma in normal subjects and patients with diarrhea proved this to be correct. In 11 normal volunteers the gut lumen-to-plasma flow of sodium averaged 13.0 mM/min, implying that the observed absorption averaging 1.65 mM/min represents a small imbalance between the bidirectional fluxes. Although 1 patient with post-gastrectomy dumping syndrome had high fluxes and another with malabsorption following gut resection gave low values, it is suggested that changes in the fluxes in the same patient are more significant than isolated observations on individuals. A considerably simpler technique has been devised for use in clinical and field studies. It is sufficiently accurate for most purposes and employs a single tracer.

3003 BACTERIAL CONTAMINATION AS A SOURCE OF ERROR IN D-GLUCOSE-BINDING STUDIES USING INTESTINAL BRUSH BORDER MEMBRANE PREPARATIONS. *(E.)* Garcia-Castineiras, S.; Torres-Pinedo, R.; Alvarado, F. (Univ. Puerto Rico Med. Sch., San Juan). *Fed. Eur. Biol. Soc. Letters* 30(1):115-119, 1973.

A study was made of the D-glucose-binding capabilities of guinea pig small intestinal brush borders and fractions thereof by using density-gradient centrifugation. Three main sucrase peaks were obtained. Fraction 2 included the heaviest components of the original preparation consisting of unbroken brush borders interspersed with other uncharacterized material. The binding properties of this fraction were similar to those previously found in brush border fractions. For instance, the binding exhibited a K_m on the order of 10 μM and was inhibited by sulfhydryl reagents and sugar analogues. Equilibrium dialysis revealed that ^{14}C-glucose disappeared steadily. A large portion of the radioactivity could be recovered as ^{14}C-CO_2. It was obvious that the preparations had been contaminated by bacteria. Mannose, 2-deoxy-glucose, and glucosamine greatly inhibited binding activity. None of these have any appreciable affinity for the sugar carrier. Glucosamine and galactosamine had no significant effect on sugar transport. It is suggested that the binding reflects glucose metabolism to CO_2 and non-volatile products, the rate-limiting step in the overall reaction being perhaps at the level of the microbial hexokinase. This accounts for the hexokinase-like specificity of the binding. The inference is very strong that the studies of binding of glucose to brush border fractions can be explained in terms of contaminating bacteria.

3004 EFFECT OF SECRETIN AND CHOLECYSTOKININ ON THE TRANSPORT OF ELECTROLYTE AND WATER IN HUMAN JEJUNUM. *(E.)* Moritz, M.; Finkelstein, G.; Meshkinpour, H.; Fingerut, J.; Lorber, S. H. (Temple Univ. Sch. Med., Philadelphia, Pa.). *Gastroenterology* 64(1):76-80, 1973.

The effect of natural porcine secretin and cholecystokinin on the transport of electrolytes and water in human jejunum was studied in 8 normal volunteers (4 male, 4 female; 22-36 yr old), utilizing a triple-lumen tube technique of perfusion. These hormones significantly inhibited the absorption of water, sodium, potassium, and chloride. A graded response was observed with both hormones: 2U/kg/hr produced significantly more fluid accumulation than 1 U/kg/hr. The effects of the hormones on the above parameters were qualitatively and quantitatively similar at the doses employed, in spite of their known different effects on motor activity. This suggests that the influence of secretin on water and electrolyte absorption is not related to its action on intestinal motor activity.

3005 THE EFFECT OF AMINO ACIDS AND DIPEPTIDES ON SODIUM AND WATER ABSORPTION IN MAN. *(E.)* Hellier, M. D.; Thirumalai, C.; Holdsworth, C. D. (St. Bartholomew's Hosp., London, England). *Gut* 14(1):41-45, 1973.

A perfusion technique has been used to quantitate the effect of glycine, alanine, and glycyl-glycine and glycyl-L-alanine on sodium and water absorption from the jejunum of 8 young healthy male volunteers. Although no net absorption of sodium and water occurred in the absence of non-electrolytes, a significant stimulation occurred in the presence of both free amino acids and dipeptides. In the case of glycine and alanine, sodium and water absorption increased linearly with increasing amino acid concentration and saturation was not demonstrated over the range of concentrations studied (10-50mM). There was one exception, since with 50 mM alanine the ratio between absorption of amino acid and sodium slackens from 1:1 observed at other concentrations, suggesting that the extent to which sodium absorption can be stimulated by alanine is limited.
In contrast, the corresponding molar ratios for the two dipeptide solutions and sodium were approximately 1:2. This stimulation of sodium and water absorption by amino acids and by dipeptides may be of physiological importance in the absorption of both exogenous and endogenous fluid by the small intestine.

3006 GLUCOSE TRANSPORT IN ISOLATED BRUSH BORDER MEMBRANE FROM RAT SMALL INTESTINE.

(E.) Hopfer, U.; Nelson, K.; Perrotto, J.; Isselbacher, K. J. (Dept. Biochem., Swiss Fed. Inst. Technol, Zurich). *J. Biol. Chem.* 248(1): 25-32, 1973.

Using a Millipore filtration technique, uptake of labeled D- and L-glucose occurred with highly purified brush border membranes from the epithelial cells of rat small intestine. The following findings indicated an intact glucose carrier system is present in the isolated membranes: D-glucose was taken up and released faster than L-glucose; sodium ions increased the initial rate and extent of D-glucose uptake 3-5-fold (no other cation showed this effect; D-glucose uptake and release was inhibited by phlorizin (0.01-1.00 mM); countertransport of D-glucose was demonstrated; D- and L-glucose reached the same level of uptake after prolonged incubation; and uptake of labeled D-glucose was inhibited by higher concentrations of unlabeled D-galactose and *vice versa*. Rather than binding to the membrane, glucose uptake by membrane vesicles represented entry into an intravesicular aqueous space. Exposure of the membrane to increasing cellobiose concentrations led to osmotic shrinkage of the intravesicular space and decreased glucose uptake. Infinite medium osmolarity and therefore zero intravesicular space resulted in no glucose uptake. D-glucose transport was stimulated by sodium in the medium, but not in the intravesicular spaces. It is concluded that isolated brush border membranes of intestinal epithelial cells retain the glucose carrier system, which is consistent with the concept that glucose transport across the brush border membrane represent "facilitated diffusion"; the glucose carrier is dependent on sodium ions; and high extracellular, but not intracellular, sodium concentrations lead to increased glucose transport.

3007 SOME CHARACTERISTICS OF THE RABBIT VERMIFORM APPENDIX AS A SECRETING ORGAN.

(E.) Blackwood, W. D.; Bolinger, R. A.; Lifson, N. (VA Hosp., Minneapolis, Minn.). *J. Clin. Invest.* 52(1):143-152, 1973.

The rabbit vermiform appendix secretes spontaneously at a relatively rapid rate (1-12 ml/h; 1.4 μl/min/cm). The electrolyte composition is similar to that of ileal fluids and independent of the secretory rate. The transmural potential difference is about 12 mV, mucosa negative. Of the major electrolytes, only HCO_3^- is secreted grossly against its electrochemical potential difference. This finding, plus the low hydraulic (or osmotic) permeability (L_p) and high secretory pressures of the organ, strongly suggests that the secretion is an active one. The passive permeability to Na^+ and Cl^- appears to be somewhat less than for small bowel. Permeability to mannitol was estimated at 2.5×10^{-7} cm. On the basis of reasonable assumptions and results with luminal test solutions of differing osmolarities, it was concluded that the L_p of the appendiceal epithelium is in the lower range of values reported for small bowel and colon; the L_p is higher for osmotic absorption than for osmotic secretion; and the rate of spontaneous secretion is insensitive to luminal anisotonicity over a wide range of values. However, sufficiently hypotonic solutions can reverse net secretion to net absorption, more by inhibiting spontaneous secretion than by increasing osmotic absorption. The rabbit vermiform appendix appears to be a useful model for the study of intestinal secretory processes.

3008 EFFECTS OF ELECTROGENIC SODIUM PUMPING ON THE MEMBRANE POTENTIAL OF LONGITUDINAL SMOOTH MUSCLE FROM TERMINAL ILEUM OF GUINEA-PIG.

(E.) Bolton, T. B. (Univ. Dept. Pharmacol., Oxford, England). *J. Physiol.* 228(3):693-712, 1973.

Glass microelectrodes were used to intracellularly record the membrane potential of the separated longitudinal muscle of the guinea-pig terminal ileum. In tissues kept at room temperature and then brought to 35° C for 15-30 min or about 1 hr, the fall in membrane potential upon changing to K^+ free solution averaged 21.4 mV and 13.4 mV, resp. Ouabain (1.7×10^{-6}M) produced a fall in membrane potential of 8.1 mV. Adding K^+ to K^+-free solution, or changing from ouabain-containing to ouabain-free solution, produced an increase in membrane potential greater than the initial fall. Adding K^+ to K^+-free solution increased membrane potential within 10 sec; this reached a maximum within 15-30 sec. This response was reduced, abolished, or converted to a depolarization by ouabain. In chloride-deficient (13 mM) solution in which membrane resistance was increased, the response to addition of K^+ increased 2½-fold so that the membrane potential sometimes exceeded - 100 mV, which was probably more negative than E_K. These results suggest that the response to adding K^+ was due to the electrogenic activity of the sodium pump. The response to briefly readmitting a fixed concentration of K^+ increased during the first 30 min in K^+-free solution. This increase was not due to an increase in membrane resistance as this fell with time in K^+-free solution; but perhaps the increase resulted from the progressive rise in internal Na^+ concentration. This is known to occur in smooth muscle in K^+-free solution. Increasing the concentration of K^+ over the range ≈ 0.1-20 mM increased the size of the electrogenic potential observed upon adding K^+ to K^+ free solution. A fall in membrane resistance occurred upon adding K^+ (0.6, 5.9, or 20 mM) which was greater the higher the concentration of K^+. Allowing for the fall in membrane resistance, the dependency of the electrogenic response upon the K^+ concentration over the range 0.6-20 mM was much increased. Results indicate that the rate of electrogenic sodium pumping in this tissue is increased by increasing external K^+ concentration, and probably by increasing internal Na^+ concentration. It was suggested that a rise in the latter could sensitize the pump to an increase in the former.

3009 THE EFFECT OF LECITHIN ON INTESTINAL CHOLESTEROL UPTAKE BY RAT INTESTINE IN VITRO.

(E.) Rampone, A. J. (Dept. Physiol., Univ. Oregon, Portland). *J. Physiol. (Lond.)* 229(2):505-514, 1973.

Sacs 20 cm long were taken from the upper half of the small intestine of bile fistula rats (bile duct cannulated 48 hr previously). The sacs were everted, filled with oxygenated phosphate buffer, and incubated 1 hr at 37° C in 25 ml of a buffered micellar solution of oleic acid (0.6 mM), monoolein (0.3 mM), sodium taurocholate (4.8 mM) and ^{3}H-cholesterol (0.15 mM) plus glucose (28 mM). After incubation the amount of ^{3}H-cholesterol taken up by the mucosal tissue was measured and averaged 200 nanomols/hr/g tissue wet weight. Adding 3 ml whole rat bile with other factors unchanged caused a 50% decrease in cholesterol uptake. Purified lecithin also decreased cholesterol uptake. A significant response was obtained with 2.5 mg liver lecithin (concentration 0.13 mM) and a near maximum response with 15 mg (concentration 0.80 mM). Lecithin decreased uptake by an amount equivalent to that obtained with 3 ml whole bile. Lecithin is an active component of whole bile causing reduced intestinal cholesterol uptake from micelles. The decreased uptake of cholesterol in the presence of lecithin may result from expansion of the cholesterol-containing micelles with consequent reduction in cholesterol permeability.

3010 GASTRIC NONABSORBABLE INDICATORS IN MAN: A COMPARISON OF PHENOL RED AND POLYETHYLENE-^{14}C GLYCOL.

(E.) Domschke, S.; Demling, J.; Domschke, W.; Hacker, J.; Classen, M.; Demling, L. (Dept. Med., Univ. Erlangen-Nurnberg, Erlangen, Germany). *Scand. J. Gastroenterol.* 8(1):17-19, 1973.

Phenol red and ^{14}C-polyethylene glycol were compared as nonabsorbable indicators by using them together in the same solution instilled with 160 mM HCl into the stomachs of 11 human subjects with no evidence of gastric disease. The ratios of initial and final concentrations of both the marker substances compared favorably with each other, giving essentially the same information about volume changes during the 60 min study period. Polyethylene glycol does have features which make its use preferable to that of phenol red: polyethylene glycol is more readily measured than phenol red, and colored samples may interfere with the analysis of phenol red, whereas the presence of chromogens does not affect sample-counting efficiency. During the next 24 hr trace amounts of phenol red appeared in both serum and urine whereas ^{14}C-polyethylene glycol did not.

3011 MECHANISMS OF DIPEPTIDE UPTAKE BY RAT SMALL INTESTINE IN VITRO.

(E.) Cheng, B.; Navab, F.; Lis, M. T.; Miller, T. N.; Matthews, D. M. (Westminster Med. Sch., London, England). *Clin. Sci.* 40(3):247-259, 1971.

The uptake of L-methionine and glycine as free amino acids and that of their dipeptides by everted rings of rat small intestine *in vitro* has been investigated with a wide range of concentrations including values likely to be near those in the lumen of the intestine. Although no intact peptides were found in the mucosal cells, evidence showed that peptide hydrolysis was cellular at all concentrations. Total peptide hydrolysis by the intestine was very great in relation to amino acid uptake over very short incubation times, suggesting hydrolysis is superficial. The rates of uptake of amino acids from peptides were more rapid than from the equivalent amino acid mixtures, except at the lowest concentrations. Competition for uptake between glycine and methionine was avoided when they were introduced as L-methionylglycine. Anoxia inhibited uptake of methionine from free L-methionine and from L-methionyl-L-methionine. It also inhibited hydrolysis of L-methionyl-L-methionine by intact intestine, but not by intestinal homogenates, suggesting that peptide uptake may be energy-dependent. The L-amino acid oxidase of snake venom, which destroys L-methionine but has no effect on glycine or on the peptides studied, inhibited methionine uptake from peptides when present at high concentrations, suggesting that a major site of hydrolysis in enzyme-accessible. These findings suggest that there may be 2 modes of uptake of amino acids from oligopeptides: (1) surface hydrolysis by mechanisms closely linked to amino acid entry mechanisms, and (2) peptide entry into mucosal cells by a special mechanism, partly or completely independent of amino acid entry mechanisms, which is ordinarily followed by intracellular hydrolysis.

3012 INTRACELLULAR Cl CONCENTRATIONS AND INFLUXES ACROSS THE BRUSH BORDER OF RABBIT ILEUM.

(E.) Frizzell, R. A.; Nellans, H. N.; Rose, R. C.; Markscheid-Kaspi, L.; Schultz, S. G. (Univ. Pittsburgh Sch. Med., Pa.). *Am. J. Physiol.* 224(2):328-337, 1973.

The intracellular Cl concentration in mucosal strips of rabbit ileum comprises a rapidly exchangeable and a slowly exchangeable fraction. On the basis of previous estimates of the intracellular electrical potential difference, it appears that the electrochemical potential of the rapidly exchangeable intracellular Cl is greater than that in the surrounding medium. Cyclic AMP, (7.5 mN) dibutyryl cyclic AMP (1 mM), theophylline (10 mM), or acetazolamide (8 mM), in the incubation medium results in significant declines in the intracellular Cl concentration. The unidirectional influx of Cl across the brush border into the epithelium is a saturable function of the Cl concentration in the mucosal solution which is inhibited by bromide, iodide, nitrate, and thiocyanate anions. Cl influx is competitively inhibited by the presence of acetazolamide in the mucosal solution. Cl influx is also inhibited by preincubation in the presence of theophylline or cyclic AMP; the inhibition by theophylline is noncompetitive. It is concluded that Cl transport from the mucosal solution across the brush border into the epithelium of rabbit ileum is an active transport process; and agents that have been shown either to inhibit active Cl absorption *in vivo* (acetazolamide) or to elicit active Cl secretion (cyclic AMP or theophylline) decrease the unidirectional Cl influx across the brush border and the intracellular Cl concentration. It appears that factors which regulate this influx process play an important role in the transition between active Cl absorption and active Cl secretion by distal small intestine.

3013 BILIRUBIN UPTAKE IN VITRO BY THE RAT INTESTINAL MUCOSA. *(E.)* Corchs, J. L.; Serrani, R. E.; Rodriguez Garay, E. (Fac. Med. Sci., Rosario Natl. Univ., Santa Fe, Argentina). *Biochim. Biophys. Acta* 291(1):308-314, 1973.

3014 EFFECT OF DIETARY SELENIUM ON THE GASTROINTESTINAL ABSORPTION OF $^{75}SeO_3$ IN THE RAT. *(E.)* Brown, D. G.; Burk, R. F.; Seely, R. J.; Kiker, K. W. (Fitzsimons Gen. Hosp., Denver, Colo.). *Int. J. Vitam. Nutr. Res.* 42(4): 588-591, 1972.

3015 EFFECTS OF CYCLOHEXIMIDE ON INFLUX ACROSS THE BRUSH BORDER OF RABBIT SMALL INTESTINE. *(E.)* Frizzell, R. A.; Nellans, H. N.; Acheson, L. S.; Schultz, S. G. (Univ. Pittsburgh Sch. Med., Pa.). *Biochim. Biophys. Acta* 291(1): 302-307, 1973.

3016 PATH OF OSMOTIC WATER FLOW THROUGH RABBIT GALL BLADDER EPITHELIUM. *(E.)* Van Os, C. H.; Slegers, J. F. G. (Dept. Physiol., Univ. Nijmegen, Netherlands). *Biochim. Biophys. Acta* 291(1):197-207, 1973.

3017 INHIBITORY ACTION OF SOME ANTIDIABETIC DIGUANIDES ON INTESTINAL LIPID ABSORPTION. *(Fr.)* Agid, R.; Marquie, G. (Paul Sabatier Univ., Inst. Physiol., Toulouse, France). *C. R. Acad. Sci. Paris* 275(16):1787-1790, 1972.

3018 BINDING STUDIES AS AN APPROACH TO THE STUDY OF INTESTINAL TRANSPORT. *(E.)* Eichholz, A.; Howell, K. E. (Rutgers Med. Sch., New Brunswick, N. J.). *Gastroenterology* 62(4): 647-667, 1972.

3019 ROUTE OF ABSORPTION OF ENDOTOXIN FROM THE INTESTINE IN NONSEPTIC SHOCK. *(E.)* Cuevas, P.; Fine, J. (Boston City Hosp., Mass.). *J. Reticuloendothel. Soc.* 11(6):535-538, 1972.

3020 RELATIONS BETWEEN THE ACTIVITY OF VARIOUS SUGARS ON CALCIUM TRANSPORT AND THEIR ABILITY TO FORM COMPLEXES. *(Fr.)* Fournier, P.; Dupuis, Y.; Fournier, A. (Lab. Comparative Study Nutr. Factors Ossification, Practical Sch. Higher Educ., Paris, France). *C. R. Acad. Sci. Paris* 275(16):1791-1794, 1972.

3021 STIMULATION BY OVINE PROLACTIN OF FLUID TRANSFER IN EVERTED SACS OF RAT SMALL INTESTINE. *(E.)* Ramsey, D. H.; Bern, H. A. (Dept. Zool., Univ. California, Berkeley). *J. Endocrinol.* 53(3):453-459, 1972.

3022 ABSORPTION OF SALICYLIC ACID AND ITS ISOMERS FROM THE RAT JEJUNUM. *(E.)* Kunze, H.; Rehbock, G.; Vogt, W. (Max Planck Inst. Exp. Med., Gottingen, Germany). *Naunyn Schmiedebergs Arch. Pharmakol.* 273(4):331-340, 1972.

3023 CALCIUM TRANSPORT IN RAT SMALL INTESTINE IN VITRO AND IN VIVO. *(E.)* Ewe, K. (1st Med. Clin., Johannes Gutenberg Univ., Mainz, Germany). *Naunym Schmiedebergs Arch. Pharmakol.* 283(4):352-365, 1972.

3024 GASTROGRAFIN-INDUCED HYPERTONICITY: THE PATHOGENESIS OF A NEONATAL HAZARD. *(E.)* Rowe, M. I.; Seagram, G.; Weinberger, M. (Univ. Miami Sch. Med., Fla.). *Am. J. Surg.* 125(2):185-188, 1973.

3025 EFFECTS OF TOLBUTAMIDE AND GLIBENCLAMIDE ON INTESTINAL GLUCOSE ABSORPTION. *(E.)* Teale, J. D.; Love, A. H. G. (Dept. Med., Queen's Univ. Belfast, Northern Oreland). *Biochem. Pharmacol.* 21:1839-1848, 1972.

3026 EFFECTS OF GLUCOSE ON NET UNIDIRECTIONAL MOVEMENTS OF WATER AND ELECTROLYTES IN THE HUMAN SMALL INTESTINE. *(E.)* Modigliani, R.; Bernier, J. J. (Hosp. St. Lazare, Paris, France). *Biol. Gastroenterol. (Paris)* 5:165-174, 1972.

3027 THE MOLECULAR SPECIFICITY OF FAT ABSORPTION. *(E.)* Rey, J.; Ricour, C. (Hosp. (Sick Children, Paris, France). *Biol. Gastroenterol. (Paris)* 5:187-204, 1972.

3028 EFFECT OF A COMBINED PREPARATION OF PROTEINASE INHIBITORS ON INSULIN ABSORPTION FROM THE SMALL INTESTINE IN DOGS. *(Rus.)* Chernikov, M. P.; Liaiman, M. E.; Nesterin, M. F. (Inst. Nutr., Moscow, USSR). *Biull. Eksp. Biol. Med.* 73(6):33-36, 1972.

3029 TRANSPORT VALUES, t_K, t_{Na}, AND t_{Cl}, FOR THE HEPATOCYTE MEMBRANE IN VIVO. *(Fr.)* Caille, J. P.; Schanne, O. F. (Fac. Med., Univ. Sherbrooke, Canada). *Can. J. Physiol. Pharmacol.* 50(5):416-422, 1972.

3030 THE DEPENDENCE OF PARACETAMOL ABSORPTION ON THE RATE OF GASTRIC EMPTYING. *(E.)* Heading, R. C.; Nimmo, J.; Prescott, L. F.; Tothill, P. (Roy. Infirm., Edinburgh, Scotland). *Br. J. Pharmacol.* 47:415-421, 1973.

3031 ALANINE EFFLUX ACROSS THE SEROSAL BORDER OF TURTLE INTESTINE. *(E.)* Hajjar, J. J.; Khuri, B. N.; Curran, P. F. (Sch. Med., Am. Univ. Beirut, Lebanon). *J. Gen. Physiol.* 60(6):720-734, 1972.

3032 INTESTINAL ABSORPTION OF STABLE HEPARINIC ACID COMPLEXES. *(E.)* Koh, T. Y.; Bharucha, K. R. (Canada Packers Ltd., Toronto). *J. Lab. Clin. Med.* 80(1):47-55, 1972.

3033 ABSORPTION OF IODIPAMIDE FROM THE BILIARY SYSTEM OF THE RABBIT. *(E.)* Nelson, J. A.; Benet, L. Z.; Goldberg, H. I. (Dept. Radiol., Univ. California, San Francisco). *J. Pharm. Pharmacol.* 24(12):993-995, 1972.

3034 DRUG TRANSFER ACROSS INTACT RAT INTESTINAL MUCOSA FOLLOWING SURGICAL REMOVAL OF SEROSA AND MUSCULARIS EXTERNA. *(E.)* Wolfe, D. L.; Forland, S. C.; Benet, L. Z. (Sch. Pharm., Univ. California, San Francisco). *J. Pharm. Sci.* 62(2):200-205, 1973.

3035 TRANSPORT OF DRUGS ACROSS THE INTESTINAL BARRIER OF RATS INTOXICATED WITH STREPTOLYSIN O AND STAPHYLOCOCCAL ALPHA TOXIN. *(E.)* Hadasova, E. (Sch. Med., Brno, Czechoslovakia). *Toxicon* 10:457-464, 1972.

3036 INTRACELLULAR SPACE CONDUCTANCE IN FROG GASTRIC MUCOSA. *(E.)* Villegas, L.; Sananes, L. (Biophys. Biochem. Ctr., Venezuelan Inst. Sci. Res., Caracas). *Biochim. Biophys. Acta* 282:205-209, 1972.

3037 MEASUREMENT OF COPPER ABSORPTION WITH EVERTED INTESTINAL SACS. *(Ger.)* Schwarz, F. J.; Kirchgessner, M. (Inst. Anim. Nutr., Technical Univ. Munich, Greising-Weihenstephan, Germany). *Int. J. Vitam. Nutr. Res.* 72(4):592-599, 1972.

See also 2982, 3048, 3076, 3118, 3191, 3193, 3195, 3199, 3405.

MOTILITY

3038 EFFECT OF PARATHYROID HORMONE ON THE PROPULSIVE GASTROINTESTINAL MOTILITY OF THE RAT. *(E.)* Segerstrom, A. (Dept. Surg., Univ. Uppsala, Sweden). *Acta Chir. Scand.* 139(1):55-59, 1973.

The influence of parathyroid hormone on gastric evacuation and intestinal propulsive motility was studied in 10 parathyroid hormone-treated rats, 14 parathyroidectomized rats given parathyroid hormone substitution, and 17 vitamin D-treated rats. The gastrointestinal motility functions were analyzed after gastric administration of nonabsorbable isotope. In intact rats parathyroid hormone accelerated gastrointestinal motility; the main effect was acceleration of gastric emptying. In parathyroidectomized rats the same dose of parathyroid hormone had no appreciable effect on gastrointestinal motility. Vitamin D-treated rats showed accelerated gastrointestinal motility, but the gastric evacuation rate was significantly slower than that in parathyroid-hormone treated rats. The different gastric emptying rates, despite the similar serum calcium response to treatment with parathyroid hormone (80 USP U/100 g/day) and vitamin D (14,400 IU/100 g/day), indicated that hypercalcemia could not be the essential factor responsible for the accelerated gastric evacuation in parathyroid-hormone treated animals.

3039 INFLUENCE OF PARATHYROID FUNCTION ON THE PROPULSIVE MOTILITY OF THE SMALL INTESTINE IN THE RAT. *(E.)* Nilsson, F.; Segerstrom, A. (Univ. Hosp., Uppsala, Sweden). *Acta Chir. Scand.* 139(1):60-62, 1973.

The propulsive motility of the small intestine was studied by intraduodenal administration of nonabsorbable $Na_2{}^{51}CrO_4$ to male parathyroidectomized rats and rats given parathyroid hormone (80 U/100 g/day and then twice a day s.c. for the 3 days before motility measurements were made). After 60 min the intestinal distribution of radioactivity was recorded with a scintillation detector. Then the curve showing distribution of radioactivity was divided into 10 equal fractions, each fraction was measured planimetrically, and the results were expressed as a percentage of the dose administered. No significant difference in intestinal distribution of radioactivity was found between parathyroidectomized animals and sham-operated controls or between animals given parathyroid hormone and saline-treated controls. These results agree with other findings that the parathyroid glands affect primarily stomach emptying. The findings may also support the theory of small intestinal autonomy.

3040 THE EFFECT OF ADENOSINE AND COLD STORAGE ON THE RESPONSE OF THE GUINEA PIG ILEUM TO VARIOUS AGONISTS.

(E.) McDougal, M. R.; Borowitz, J. L. (Dept. Pharmacol. Toxicol., Purdue Univ., Lafayette, Ind.). *Arch. Int. Pharmacodyn. Ther.* 195(1):177-184, 1972.

Adenosine (10^{-5}M) strongly inhibited the contractile responses of the isolated guinea-pig ileum to nicotine or hypertonic potassium while the responses to tetramethylammonium (TMA) or isotonic potassium were slightly inhibited. The effect of adenosine on contractions induced by nicotine or TMA was abolished by cold storage of the isolated ileum at 0-3 C for 24 hr, but a small residual antagonism of the action of hypertonic potassium by adenosine remained. Barium and serotonin contractions, shown previously to be strongly inhibited by adenosine in the guinea-pig ileum, were not affected by adenosine after cold storage of 9 strips. The selective inhibition of indirect-acting agonists by adenosine after cold storage of the intestine indicate the adenosine after cold storage of the intestine indicate that adenosine may exert its effect largely on the neural elements of the guinea-pig ileum.

3041 PHYSIOLOGICAL CHARACTERISTICS OF THE HUMAN PYLORIC SPHINCTER.

(E.) Fisher, R.; Cohen, S. (Univ. Pennsylvania Hosp., Philadelphia). *Gastroenterology* 64(1):67-75, 1973.

To investigate the physiological characteristics of the human pylorus, simultaneous measurements of intraluminal pressure and skin-to-mucosa potential difference were made in 28 normal subjects (20 males, 8 females, aged 21-76 yr). The radiographic junction of the stomach and duodenum was marked by a potential difference change of 33.7 millivolts and a high pressure zone with an amplitude of 5.3 mm Hg and a length of 1.5 cm. A brief diminution in pressure at the pylorus occurred with antral peristaltic contraction. During the infusion of 0.1 N HCl into the duodenum, pyloric pressure increased to 17.2 mm Hg. Pressure did not change during NaCl perfusion of the duodenum. The reflux of duodenal infusion solution into the stomachs, as measured with a phenol red marker, was only 1.8% during HCl perfusion compared with 34.2% during NaCl perfusion. The pyloric pressure also increased significantly with duodenal instillation of olive oil (269.4%) amino acids (hypertonic, 255.6% and isotonic 104.8%) and hypertonic glucose in water (149.7%). Neither hypertonic NaCl nor isotonic glucose significantly altered pyloric pressure. These studies indicated that the human pylorus had a high pressure zone that relaxed with antral peristalsis; contracted in response to endogenous duodenal stimuli; and altered the retrograde movement of duodenal contents into the stomach. It is suggested that the human pylorus is a true physiological sphincter.

3042 EVIDENCE THAT ACETYLCHOLINE RELEASED BY GASTRIN AND RELATED POLYPEPTIDES CONTRIBUTES TO THEIR EFFECT ON GASTROINTESTINAL MOTILITY.

(E.) Vizi, S. E.; Bertaccini, G.; Impicciatore, M.; Knoll, J. (Inst. Pharmacol., Univ. Parma, Italy). *Gastroenterology* 64(2): 268-277, 1973.

Gastrin- and cholecystokinin-like polypeptides (C-terminal octapeptide amide of cholecystokinin-pancreozymine, gastrin I, cerulein, and pentagastrin) released acetylcholine from the Auerbach plexus of longitudinal muscle strips of guinea pig ileum. The evidence indicated that concentrations of intestine in response to these peptides are due to the acetylcholine released. Tetrodotoxin (5×10^{-7} g/ml) and norepinephrine (10^{-6} g/ml) inhibited actions of peptides both on acetylcholine release and on mechanical responses of intestine. However, hexamethonium (3×10^{-4} g/ml) failed to affect their actions, indicating that their site of action is situated on non-nicotinic receptors of ganglionic cells. C-terminal octapeptide amide of cholecystokinin-pancreozymin and cerulein produced significant acetylcholine release in concentrations as low as 9×10^{-10} and 7.5×10^{-10}M, resp. Human gastrin I was much less effective, its threshold concentration being 7×10^{-8}M. Both exogenous and endogenous norepinephrine reduced both the acetylcholine release and the contractions of longitudinal muscle produced by peptides. Norepinephrine acted at a presynaptic site and its action was mediated through α receptors. It is concluded that gastrointestinal hormones may act as hormonal factors in regulating gastrointestinal motility, and their effect is controlled by the tonic activity of the sympathetic nervous system which reduces acetycholine release.

3043 STUDIES ON DEFECATION REFLEX IN MAN.

(E.) Kock, N. G.; Kewenter, J.; Sundin, T. (Sahlgren Hosp., Univ. Goteborg, Sweden). *Scand. J. Gastroenterol.* 7(8):689-693, 1972.

In 3 patients with cecostomies and in patients with urinary bladder substitutes obtained from either the sigmoid colon (4 patients) or the cecum (3 patients), the motor activity in different parts of the large bowel was recorded with open tip tubes and a pressure-recording apparatus after administration of a contact laxative, Dulcolax (bisacodyl). Dulcolax administered into the cecum of patients with cecostomy produced motor activity locally and in the transverse colon and in the isolated sigmoid bladder substitute, but When the drug was administered into the cecum of patients with isolated cecal bladder replacements, motor activity was recorded in the cecum but not in the sigmoid. Rectal application of Dulcolax initiated motor activity in the intact sigmoid and in the isolated sigmoid bladder substitute, but not in the cecum in patients with cecostomies nor in the cecal bladder replacements. The experiments indicate that only the left colon is engaged in the defecation mechanism elicited by rectal stimulation. The motor response in the left colon after rectal stimulation is mediated by a reflex with its afferent limb from the rectal ampulla. Intrinsic nervous pathways in the intestinal wall mediate impulses which elicit the motor response in the sigmoid after cecal stimulation.

3044 INTESTINAL MOTILITY AFTER EXTENSIVE RESECTION OF THE SMALL INTESTINE. *(Fr.)* Duret, R. L. (no affil.). *Acta Gastroenterol. Belg.* 35:181-198, 1972.

3045 EFFECT OF METOCLOPRAMIDE ON GASTRIC EMPTYING DURING LABOUR. *(E.)* Howard, F. A. Sharp, D. S. (Univ. Hosp. South Manchester, England). *Br. Med. J.* 1(5851):446-448, 1973.

3046 EFFECT OF PROSTAGLANDIN E_1 ON THE PERISTALTIC ACTIVITY OF THE GUINEA-PIG ISOLATED ILEUM. *(E.)* Radmanovic, B. Z. (Med. Fac., Belgrade, Yugoslavia). *Arch. Int. Pharmacodyn. Ther.* 200(2):396-404, 1972.

3047 CYCLIC AMP AND CALCIUM IONS IN MECHANICAL AND METABOLIC RESPONSES OF SMOOTH MUSCLES: INFLUENCE OF SOME HORMONES AND DRUGS. *(E.)* Andersson, R. G. G. (Sch. Med., Linkoping, Sweden). *Acta Physiol. Scand.* suppl. 382:1-59, 1972.

3048 THE EFFECT OF ACETYLCHOLINE ON THE ELECTRICAL ACTIVITY OF INTESTINAL EPITHELIAL CELLS. *(E.)* Hardcastle, P. T.; Eggenton, J. (Dept. Physiology, Univ. Sheffield, England). *Biochim. Biophys. Acta* 298(1):95-100, 1973.

3049 CORRELATIONS BETWEEN ELECTRICAL ACTIVITY IN THE STOMACH AND DUODENUM. *(It.)* Abbadessa Urso, S.; Montalbano, M. E.; Fileccia, R.; Pastore, R. (Inst. Gen. Physiol., Univ. Palermo, Italy). *Boll. Soc. Ital. Biol. Sper.* 48(17):469-473, 1972.

3050 THE EFFECT OF COLD STORAGE ON THE INHIBITORY ACTION OF ISOPRENALINE, PHENYLEPHRINE AND NICOTINE ON THE MECHANICAL AND MEMBRANAL ACTIVITIES OF GUINEA-PIG TAENIA CAECUM. *(E.)* Fukuda, H.; Shibata, S. (Sch. Med., Univ. Hawaii, Honolulu). *Br. J. Pharmacol.* 46(3):438-448, 1972.

3051 BIOELECTRICAL ACTIVITY OF NONMYELINATED C FIBERS OF INTESTINAL NERVES ON INJECTION OF LACTIC ACID INTO ARTERIES OF THE SMALL INTESTINE. *(Rus.)* Lebedeva, V. A.; Filippova, L. V. (I. P. Pavlov Inst. Physiol., Leningrad, USSR). *Fiziol. Zh. SSSR* 58(12):1856-1863, 1972.

3052 ACTIONS OF EMETINE, DEHYDROEMETINE, QUININE AND QUINIDINE ON FINKLEMAN PREPARATION OF RABBIT ILEUM. *(E.)* Achari, G.; Banerji, P. K.; Kapoor, K. (P. W. Med. Coll., Patna, India). *Indian J. Med. Res.* 60:273-275, 1972.

3053 RELAXATION OF INTESTINAL SMOOTH MUSCLE AND CALCIUM MOVEMENTS. *(E.)* Tomiyama, A.; Takayanagi, I.; Takagi, K. (Fac. Pharm. Sci., Univ. Tokyo, Bunkyo-ku, Japan). *J. Pharm. Pharmacol.* 25(1):65-68, 1973.

3054 VAGOSYMPATHETIC SEGMENTING REFLEXES IN IN THE ASCENDING COLON OF THE DOG. *(E.)* Tansy, M. F.; Kendall, F. M.; Mackowiak, R. C.; Murphy, J. J. (Temple Univ. Health Sci. Ctr., Philadelphia, Pa.). *J. Surg. Res.* 3:102-108, 1972.

3055 AFFERENT VAGAL IMPULSES FROM THE LOWER OESOPHAGEAL SPHINCTER OF THE CAT. *(E.)* Mei, N.; Salducci, J.; Monges, H.; Farnarier, F. (C.N.R.S. Inst. Neurophysiol. Psychophysiol., Marseille, France). *Rendic. Gastroenterol.* 4(2):65-68, 1972.

3056 THE ELECTRICAL ACTIVITY OF THE HUMAN INTESTINE. *(E.)* Labo, G.; Lanfranchi, G. A.; Bortolotti, M.; Miglioli, M.; Barbara, L. (2nd Dept. Med., Univ. Bologna, Italy). *Rendic. Gastroenterol.* 4(2):87-93, 1972.

3057 EFFECT OF SECRETIN ON ELECTRIC ACTIVITY IN THE STOMACH IN SWINE. *(Fr.)* Roze, C.; Couturier, D.; Lagneau, P.; Gilles, M. R.; Debray, C. (Bichat Hosp., Paris, France). *C. R. Acad. Sci. Paris* 275(16):1783-1786, 1972.

3058 NEUROHUMORAL REGULATION OF MOTILITY AND BLOOD FLOW IN THE COLON. *(E.)* Fasth, S.; Hulten, L. (Sahlgren Hosp., Univ. Goteborg, Sweden). *Experientia* 28(12):1447-1448, 1972.

3059 NONMUCOSAL SEROTONIN IN MOTILITY OF THE SMALL BOWEL WHEN SUBJECTED TO ACUTE ANOXIC TRAUMA. *(E.)* Abe, H.; Appert, H.; Carballo, J.; Howard, J. M. (Hahnemann Med. Coll., Philadelphia, Pa.). *Arch. Surg.* 106(2):183-187, 1973.

3060 THE EFFECTS OF CAFFEINE ON E-C COUPLING IN GASTROINTESTINAL SMOOTH MUSCLE. *(E.)*

McFarland, S. A.; Pfaffman, M. A. (Univ. Mississippi Med. Sch., Jackson). *Arch. Int. Pharmacodyn. Ther.* 198(1):49-60, 1972.

3061 COHERIN: A NEW PEPTIDE OF THE BOVINE NEUROHYPOPHYSIS WITH ACTIVITY ON GASTROINTESTINAL MOTILITY. *(E.)* Goodman, I.; Hiatt, R. B. (Coll. Phys. Surg., Columbia Univ., New York). *Science* 178:419-421, 1972.

3062 SPONTANEOUS AND INDUCED CONTRACTILE ACTIVITY OF THE MUSCLE COAT OF THE HUMAN GALL BLADDER. *(E.)* Grosso, G.; Musi, L. (Munic. Hosp., Genoa, Italy). *Surg. Italy* 1(3): 230-247, 1971.

3063 THE EFFECTS OF ESERINE AND NEOSTIGMINE ON THE GUINEA-PIG ILEUM AND ON ILIAL LONGITUDINAL MUSCLE STRIPS. *(E.)* Cox, B.; Lomas, D. M. (Dept. Pharmacol., Univ. Manchester, England). *J. Pharm. Pharmacol.* 24(7):541-546, 1971.

3064 THE MOTILITY AND INNERVATION OF THE LARGE INTESTINE OF THE BULLFROG. (RANA CATESBIANA). *(Jap.)* Hukuhara, T.; Naitoh, T.; Fujiwara, Y. (Kawasaki Med. Coll., Kurashiki, Japan). *Jap. J. Smooth Muscle Res.* 8(2):85-98, 1972.

3065 EFFECTS OF A CRUDE PREPARATION OF COLOSTROKININ COMPARED WITH THOSE OF BRADYKININ ON ISOLATED RAT DUODENAL SEGMENTS. *(E.)* Beretta, C.; Gallina, G.; Ormas, P.; Faustini, R. (Dept. Veterinary Pharmacol., Univ. Milan, Italy). *Pharmacol. Res. Commun.* 4(2):87-89, 1972.

3066 THE INFLUENCE OF DRUGS UPON $^{42}K^+$ FLUXES IN GUINEA-PIG ILEUM IN VITRO. *(E.)* Banerjee, A. K. (Inst. Physiol., Univ. Glasgow, Scotland). *Arch. Int. Pharmacodyn. Ther.* 198(1): 173-186, 1972.

3067 JEJUNAL PROPULSIVE MOTILITY OF THE DOG. INFLUENCE OF NEOSTIGMINE AND DIHYDROERGOTAMINE. *(E.)* Dubois, A.; Bremer, A. (St. Pierre Univ. Hosp., Brussels, Belgium). *Arch. Int. Pharmacodyn. Ther.* 198(1):162-172, 1972.

3068 ATRAUMATIC RECORDING OF GASTRIC CONTRACTIONS IN CONSCIOUS, UNRESTRAINED RATS. *(E.)* Roth, R. P.; Tansy, M. F. (Natl. Inst. Environ. Health Sci., Research Triangle Park, N.C.). *J. Pharm. Sci.* 61(9):1357-1360, 1972.

3069 ADVANCES IN GASTRODUODENAL MOTOR PHYSIOLOGY. *(It.)* Arrigo, L. (Inst. Hum. Physiol., Univ. Genoa, Italy). *Rass. Arch. Chir.* 9(6):325-338, 1971.

See also 2982, 3030, 3095, 3205, 3317, 3405, 3582.

SECRETION AND METABOLISM

Stomach

3070 DUODENAL INHIBITION OF GASTRIC ACID SECRETION. *(E.)* Andersson, S. (Dept. Pharmacol., Karolinska Inst., Stockholm, Sweden). *Acta Hepatogastroenterol.* 19(6):458-463, 1972.

In dogs with gastric and pancreatic fistulas, the effect of acidifying isolated duodenal bulb pouches with 0.1N HCl on gastric and pancreatic secretion was studied. Acidification of the duodenal bulb significantly inhibited pentagastrin-stimulated gastric acid secretion but had no effect on pancreatic volume or enzyme output. In contrast, acidification of a considerably longer segment of the postbulbar duodenum induced a significant pancreatic response but only slightly inhibited gastric secretion. Exogenous secretin (0.25 or 0.50 U/kg/hr) significantly increased pancreatic response without affecting gastric secretion. These findings suggest that acid causes the release of a specific inhibitor of gastric acid secretion from the duodenal bulb. This agent differs from both secretin and cholecystokinin-pancreozymin.

3071 2 DDG [2-DEOXY-D-GLUCOSE] STIMULATION OF GASTRIC ACID AND PEPSIN SECRETION IN DOGS. *(E.)* Mignon, M.; Varro, V.; Vatier, J.; Bonfils, S. (Bichat Hosp., Paris, France). *Acta Hepatogastroenterol.* 19(6):464-469, 1972.

Four gastric fistula Beagle dogs were stimulated by slow i.v. infusion of graded doses of 2-deoxy-D-glucose (50, 100 and 150 mg/kg/3hr) for 3-4 hr. Acid and pepsin outputs were measured. In 2 dogs the secretory responses to continuous infusions were compared to those obtained with fast i.v. injections. A state of prolonged gastric vagal stimulation has been obtained; onset of responses and secretory levels depended upon the doses tested. The response is stable for both acid and pepsin secretions during the entire period of stimulation and subsides slowly after discontinuation of the stimulation. In 2 dogs stimulation was prolonged to 4 hr at a dose of 33 µg/kg/hr. However, when high levels of secretion were obtained (i.e., with the largest doses) a fading of the responses more marked for acid than for pepsin secretion, was noted. Under the conditions of these experiments the dose-related increments in acid and pepsin outputs are parallel. Therefore, a strong linear correlation exists between acid and pepsin output during each 15 min interval, no matter what the injected dose of 2-deoxy-D-glucose or the timing of the sample. Blood sugar variations were not very marked but became progressively greater during the slow administration of 2-deoxy-D-glucose. They were distinct but transitory during rapid injection. Secondary effects, which occurred with the largest doses, included a hypoglycemic-like effect, causing the dog to collapse in his Pavlov-stand as well as frequent biliary reflux and occurrence of blood in gastric juice.

3072 THE EFFECT OF ACETIC ACID ON GASTRIC SECRETION STIMULATED BY ENDOGENOUS GASTRIN IN VAGALLY DENERVATED CANINE FUNDIC POUCHES.

(E.) Aubrey, D. A.; Burns, G. P. (Llandough Hosp., Cardiff, Wales). *Am. J. Dig. Dis.* 18(2): 99-108, 1973.

The gastric secretory responses in 3 adult dogs of vagally denervated fundic pouches stimulated by endogenous gastrin have been defined following exposure to 40 ml of an acetic acid solution (100 mM) at pH 2. In order to compare the secretory changes induced by exposing both the resting and the actively secreting mucosa to acetic acid, the organic acid was placed in the pouches either before or 75 min after stimulation by a standard meat meal. Exposure to acetic acid caused inhibition of secretion, which was more pronounced when the organic acid was placed in the resting pouches. The organic acid also caused enhanced exchange-diffusion which was reflected by increased exsorption of Na$^+$. The outputs of Na$^+$ were higher when acetic acid was placed in the actively secreting, as opposed to the resting, pouches. Since it is anticipated that gastric mucosal permeability anticipated that gastric mucosal permeability would increase more during the 1st than during the 3rd hr after exposure to acetic acid, the differences in the times of appearance of peak outputs of Na$^+$ was probably a reflection of differences in availability of H$^+$. The electrolytic interrelations in the gastric juice were not altered by exposure of the pouches to acetic acid.

3073 GASTRIN RELEASE IN VAGALLY STIMULATED GASTRIC ACID SECRETION IN DOGS.

(E.) Orahood, R. C.; Beesley, W. H.; Dutta, P.; Eisenberg, M. M. (Dept. Surg., Univ. Minnesota, Minneapolis). *Amer. J. Surg.* 125(1):39-45, 1973.

Continuous vagal stimulation with 2-deoxy-D-glucose (25 mg/kg/hr) was administered to 4 dogs with gastric fistulas and Heidenhain pouches before and after antrectomy. An 86% fall in gastric fistula acid output was seen after antrum removal. Heidenhain pouch acid output fell 36% after antrectomy and the mean acid output was not significantly greater than basal levels. Increased doses of 2-deoxy-D-glucose (50 mg/kg/hr and 100 mg/kg/hr) postantrectomy failed to restore gastric fistula output to preantrectomy levels. Small doses of pentagastrin (0.050 µg/kg/hr i.v.) coupled with 2-deoxy-D-glucose (25 mg/kg/hr) did significantly increase acid secretion more than the individual effects of pentagastrin and 2-deoxy-D-glucose combined, demonstrating true synergism. 2-Deoxy-D-glucose and barely suprathreshold pentagastrin were as effective as quadrupling the 2-deoxy-D-glucose dose alone. The loss of antral gastrin, however, after antrectomy was not compensated for by supplementary pentagastrin. Vagal-antral gastrin, although small in magnitude, is believed to be an important contributor to the vagal mechanism of acid secretion because of its potentiating synergism with parasympathetic innervation of the oxyntic glands.

3074 EFFECT OF FAT IN THE DUODENUM ON GASTRIC ACID SECRETION IN CATS.

(E.) Deveney, K.; Way, L. W. (Dept. Surg., Univ. California, San Francisco). *Gastroenterology* 62(3):405-411, 1972.

Instillation of 15 ml of emulsified fat into the duodenum stimulated acid secretion from the Heidenhain pouches in 3 cats with gastric fistulas, Heidenhain pouches, and duodenal cannulas. Pentagastrin (1-8 µg/kg/hr) or histamine dihydrochloride (0.02-0.16 mg/kg/hr) were given i.v. and acid output was measured from the Heidenhain pouches with the gastric fistulas open. Either 15 ml of fat or 0.15 M NaCl was infused into the duodenum after acid secretion had reached a plateau. Fat increased acid secretion from the Heidenhain pouches at all doses of pentagastrin or histamine; the increase was greatest at low doses and became insignificant at higher doses. Cholecystokinin (8.0 U/kg/hr i.v.) evoked acid secretion which was slightly less than that induced by 15 ml of fat in the duodenum. With both cholecystokinin- and fat-evoked acid secretion, peak output occurred 30 min after infusion was started. When this dose of cholecystokinin was given with varying doses of pentagastrin, acid secretion increased at the lower pentagastrin doses but not at the higher ones. Therefore, in cats, both fat in the intestine and exogenous cholecystokinin behave as full agonists for acid secretion. There is no evidence that fat releases any substance which could be considered an enterogastrone in this species.

3075 PHYSIOLOGICAL AND IMMUNOLOGICAL STUDIES WITH DESAMIDOGASTRIN.

(E.) McGuigan, J. E.; Thomas, H. F. (Univ. Florida Coll. Med., Gainesville). *Gastroenterology* 62(4):553-558, 1972.

The physiological activity of nonamidated human gastrin I (desamidogastrin) was examined. Desamidogastrin (0.1-10 µg/kg/hr) was administered by constant i.v. infusion to 3 dogs with Heidenhain pouches. In contrast to human gastrin I, desamidogastrin did not stimulate acid output from the Heidenhain pouches. In addition, the immunological reactivity of desamidogastrin with antibodies to human gastrin I was assessed. Antibodies to human gastrin I were those produced by repeated immunization of rabbit with human gastrin I, residues 2 to 17, covalently conjugated to bovine serum albumin. There was no detectable increase in serum immunoassayable gastrin during infusion with any concentration of desamidogastrin. When the gastrin carboxyl-terminal amide group was removed, more than 99% of the immunological reactivity of human gastrin I molecules with these antibodies to gastrin was lost.

3076 DEXTRAN PERMEABILITY, ELECTRICAL PROPERTIES. AND H^+ SECRETION IN ISOLATED FROG GASTRIC MUCOSA AFTER ACETYLSALICYLIC ACID. *(E.)* Flemstrom, G.; Marsden, N. V. B. (Biomed. Ctr., Univ. Uppsala, Sweden). *Gastroenterology* 64(2):278-284, 1973.

Marked permeability changes result from exposure of the secretory (luminal) side of the isolated frog gastric mucosa to 5 or 10 mM acetylsalicylic acid, mainly in the non-ionized form at pH 3.00. After exposure to acetylsalicylic acid, the mucosa, normally impermeable to the trisaccharide raffinose, allows much larger dextran molecules to pass through. Dextran permeability is probably characterized by molecular sieving with a molecular weight of about 30,000 as the upper limit for permeation, corresponding to an equivalent diffusion radius of about 40 A. These concentrations of non-ionized acetylsalicylic acid also depress H^+ secretion and reduce the resistance, electrical potential difference, and short circuit current. With longer exposure times the potential difference as short circuit current decreased rapidly to sustained low levels while the resistance declined progressively, sometimes after a small initial increase. While a lower concentration of non-ionized acetylsalicylic acid at pH 3.00 (1 mM) or 10 mM ionized acetylsalicylic acid (pH 7.12) depressed the H^+ secretion rate, they affect neither the saccharide permeability nor the electric properties. Thus increased permeability to the nonelectrolytes is associated with increased ionic conductivity (decreased resistance). Depression of the electrogenic properties reflects probably some degree of internal short-circuiting in the abnormally permeable mucosa and also a direct inhibition of the electrogenic transport properties.

3077 THE ROLE OF THORACIC DUCT LYMPH IN GASTRIN TRANSPORT AND GASTRIC SECRETION. *(E.)* Clendinnen, B. G.; Reeder, D. D.; Thompson, J. C. (Univ. Texas Med. Branch, Galveston). *Gut* 14(1): 30-34, 1973.

The effect of thoracic lymph diversion on gastric secretion was studied in dogs with fundic pouches and antral fistulas. In addition, the concentration of gastrin in thoracic duct lymph of 9 dogs and 2 patients with chronic fistulas of the thoracic duct was measured before and during antral stimulation with either food or acetylcholine. The secretory studies do not reveal a significant gastric secretagogue in thoracic duct lymph. The amount of gastrin carried in thoracic duct lymph as determined by radioimmunoassay is about 1/1000 of that necessary to evoke a gastric secretory response.
necessary to evoke a gastric secretory response.

3078 PROSTAGLANDIN E_2 AND GASTRIC ACID SECRETION IN MAN. *(E.)* Bennett, A.; Stamford, I. F.; Unger, W. G. (King's Coll. Hosp., London, England). *J. Physiol. (Lond.)* 229(2): 349-360, 1973.

Extracts of human stomach homogenized in Krebs solution had more prostaglandins E_2 (PGE_2)-like activity than tissue homogenized in acid/ethanol or in the presence of indomethacin, indicating that the tissue can synthesize PGE_2. The distribution and synthesis of PGE_2-like substance in human stomach was determined by extracting frozen sections cut parallel to the mucosal surface. Peak levels usually occurred at a depth of 0-600 μm in the mucosa. Small amounts of a PGE_2-like substance were present in basal gastric juice, and its concentration was usually even lower in secretion stimulated by pentagastrin (0.3 μg/kg/hr i.v.) or histamine. Submaximal acid secretion produced by i.v. infusion of pentagastrin generally fell slightly when 200 mg indomethacin was administered rectally to inhibit PG synthesis. These experiments, together with the findings that p.o. administered PGE compounds do not inhibit human gastric acid secretion, seem to argue against a possible inhibitory role for PGE_2 in gastric acid secretion in man. If this is true, it would follow that gastric bleeding caused by aspirin-like drugs is not due to increased acid secretion. Tissue damage following vasoconstriction and ischemia, due to inhibition of PG synthesis in blood vessels, may contribute to the bleeding.

3079 SECRETORY FUNCTION OF CANINE STOMACH IN VITRO AFTER PROLONGED HYPOTHERMIC AND HYPERBARIC PRESERVATION. *(E.)* Kowalewski, K.; Jirsch, D. W.; Kolodej, D. V. M. (Surg. Med. Res. Inst., Edmonton, Canada). *Surg. Gynecol. Obstet.* 136(2):225-233, 1973.

Isolated whole canine stomachs were preserved for 24 hr at 4°C and 3 atmospheres of oxygen. They were then perfused *ex vivo* with homologous blood of living supporting dogs. Blood gases and gastric secretion were studied during the perfusion period. Stomachs perfused without prior preservation served as controls. Intra-arterial histamine (150 μg/hr) and bethanechol chloride (500 μg/hr) were used as secretory stimulants. An additional series of stomachs was used only for biochemical and histologic study, and mucosa was sampled before and after preservation. Preservation produced moderate reduction in high-energy phosphate compounds of gastric mucosa. After perfusion, adenosine-5'-triphosphate of gastric mucosa returned to prestorage values. Gastric secretion of the preserved stomach was alkaline during the first 2-3 hr of perfusion. Then H$^+$ appeared, and high H$^+$ output continued during the entire perfusion experiment. In stomachs used for control studies, H$^+$ was present from the beginning of perfusion, and its output was much higher than in preserved and perfused stomachs. Oxygen consumption, recorded during perfusion, was higher in previously preserved stomachs than in controls. Histologic changes observed after preservation alone were limited to the retention of mucus in fundic mucosa and excess deposit of mucus over the fundus. After preservation and perfusion, this abnormality was not found. However, moderate dilatation of gastric glands occurred, particularly in the upper third of the mucosa. No abnormality was observed in chief and parietal cells.

3080 PATHOPHYSIOLOGY OF GASTRIC SECRETION AFTER EXTENSIVE RESECTION OF THE SMALL INTESTINE. *(Fr.)* Ectors, P.; deGraef, J. (St. Pierre Univ. Hosp., Brussels, Belgium). *Acta Gastroenterol. Belg.* 35:199-209, 1972.

3081 COMPARISON OF HISTAMINE AND CAERULEIN STIMULATION OF GASTRIC SECRETION IN THE RAT UNDER NORMAL OXYGEN CONDITIONS AND IN HYPOXIA. *(E.)* Cannata, B.; Alonso, A.; Zeolite, C.; Figueroa, E.; Suarez, J. R. E. (Sch. Med., Natl. Univ. Cuyo, Mendoza, Argentina). *Acta Gastroenterol. Latinoam.* 4(2):57-60, 1972.

3082 EFFECT OF HUMAN AND CANINE GASTRIC JUICE EXTRACTS ON GASTRIC SECRETION AND AMINOPYRINE CLEARANCE IN HEIDENHAIN POUCH IN DOGS. *(E.)* Semb, L. S. (Ulleval Hosp., Oslo, Norway). *Acta Hepatogastroenterol.* 19(4):264-271, 1972.

3083 THE EFFECT OF HEPARIN ON HISTAMINE-STIMULATED GASTRIC SECRETION IN HEIDENHAIN POUCH DOGS. *(E.)* Semb, L. S. (Ulleval Hosp., Oslo, Norway). *Acta Hepatogastroenterol.* 19(5):373-376, 1972.

3084 NICOTINE AND GASTRO-INTESTINAL SECRETIONS. *(E.)* Konturek, S. J. (Med. Acad., Krakow, Poland). *Acta Hepatogastroenterol.* 19(6):413-417, 1972.

3085 INTRAVENOUS PREDNISOLONE AND ACETIC ACID ON THE ANTRAL PHASE OF GASTRIC SECRETION. *(E.)* Aubrey, A.; Burns, G. P. (Llandough Hosp., Nr. Penarth. Glam., Wales). *Arch. Surg.* 105(3): 467-472, 1972.

3086 EFFECT OF PROPRANOLOL ON GASTRIC ACID SECRETION IN RATS. *(E.)* Danhof, I. E.; Geumei, A. (Univ. Texas Southwestern Med. Sch., Dallas). *Br. J. Pharmacol.* 46(1):170-171, 1972.

3087 INTRAMUCOSAL GASTRIC ACID CONCENTRATION DETERMINED BY GLASS MICROELECTRODE TECHNIQUE. *(E.)* Winship, D. H.; Caflisch, C. R. (Univ. Missouri Sch. Med., Columbia). *Biochim. Biophys. Acta* 291(1):280-286, 1973.

3088 INHIBITORY AND STIMULATORY EFFECTS OF SECRETIN ON GASTRIC SECRETION IN CONSCIOUS RATS. *(E.)* Johansson, I.; Lundell, L.; Svensson, S. E. (Inst. Physiol., Univ. Lund, Sweden). *Br. J. Pharmacol.* 46(1):94-100, 1972.

3089 THE EFFECTS OF ISOPRENALINE AND NORADRENALINE ON PENTAGASTRIN-STIMULATED GASTRIC ACID SECRETION AND MUCOSAL BLOOD FLOW IN THE DOG. *(E.)* Curwain, B. P.; Holton, P. (St. Mary's Hosp. Med. Sch., London, England). *Br. J. Pharmacol.* 46(2):225-233, 1972.

3090 COMPARISON OF TWO TECHNIQUES TO DETERMINE THE DOSE RESPONSE CURVES FOR ACID OUTPUT TO GRADED DOES OF HISTAMINE AND PENTAGASTRIN IN CONSCIOUS CATS. *(E.)* Emas, S.; Svensson, S. O. (Gen Hosp., Malmo, Sweden). *Acta Hepatogastroenterol.* 19(6):451-455, 1972.

3091 EFFECT OF VIBRATION ON THE SECRETORY FUNCTION OF GASTRIC MUCOSA. *(E.)* Jurczak, M. E. (Military Inst. Aviation Med., Warsaw, Poland). *Acta Physiol. Pol.* 23(1):43-47, 1972.

3092 USE OF A SEGMENT OF GUINEA-PIG INTESTINE TO DETERMINE THE BIOLOGICAL ACTIVITY OF INTRINSIC FACTOR PRESENT IN HUMAN GASTRIC JUICE. *(Fr.)* Wolff, R.; Nicolas, J. P.; Jeanmaire, N. (Fac. Med., Nancy, France). *Ann. Biol. Clin. (Paris)* 39(3):271-278, 1972.

3093 CHOLINERGIC RECEPTORS INVOLVED IN THE PRODUCTION OF GASTRIC ACID. *(E.)* Doss, J.; van Zwieten, P. A. (Christian Albrecht Univ., Kiel, Germany). *Arch. Int. Pharmacodyn. Ther.* 197(2):245-260, 1972.

3094 TOPICALLY ADMINISTERED PREDNISOLONE AND THE ANTRAL PHASE OF GASTRIC SECRETION. *(E.)* Aubrey, D. A.; Burns, G. P. (Univ. Hosp. Wales, Heath Park, Cardiff). *Arch. Surg.* 105(3): 448-453, 1972.

3095 THE EFFECT OF SOME MOLECULES AND IONS ON GASTRIC FUNCTION IN THE MILK-FED CALF. *(E.)* Bell, F. R.; Razig, S. A. D. (Roy. Vet. Coll., London, England). *J. Physiol. (Lond.)* 228(2):513-526, 1973.

3096 ELECTROPHORETIC ANALYSES OF SOLUBLE PROTEINS IN RAT ORGANOGENESIS. I. FINAL DIFFERENTIATION OF STOMACH TISSUES AS VISUALIZED BY GAIN OF SOME AND LOSS OF OTHER PROTEIN MOLECULES. *(E.)* Serman, D.; Skreb, N. (Med. Fac., Univ. Zagreb, Yugoslavia). *Bull. Sci.* [*A*] 17(9/10):295-296, 1972.

3097 ELECTROLYTES OF GASTRIC JUICE COLLECTED FROM TOTALLY ISOLATED CANINE EX VIVO STOMACHS. *(E.)* Kowalewski, K.; Scharf, R. (Surg. Med. Res. Inst., Univ. Alberta, Edmonton, Canada). *Can. J. Surg.* 15(6):360-368, 1972.

3098 CONTROLLING INFLUENCES OF THE STOMACH AND SMALL INTESTINE ON SECRETION FROM GASTRIC GLANDS. *(Rus.)* Korot'ko, G. F.; Latipova, K. Iu. (M. I. Kalinin State Med. Inst., Andizhan, USSR). *Fiziol. Zh. SSSR* 58(12):1864-1869, 1972.

3099 UROPEPSINOGEN EXCRETION AS A FUNCTION OF DIET. *(Rus.)* Smolianskii, B. L. (Leningrad Med. Inst. Sanit. Hyg., USSR). *Fiziol. Zh. SSSR* 58(12):1870-1874, 1972.

3100 CHOLINESTERASE ACTIVITY IN THE PLASMA AND ACID-SECRETORY GASTRIC MUCOSA OF NORMAL, CASTRATED, AND CASTRATED OESTROGEN-TREATED MALE RATS. *(E.)* Omole, A. A. (Dept. Physiol., Univ. Ibadan, Nigeria). *J. Pharm. Pharmacol.* 24(7):538-540, 1972.

3101 NUMERICAL AND DISTRIBUTIONAL INEQUALITIES BETWEEN THE OXIDOREDUCTASE-POSITIVE GASTRIC PARIETAL CELLS IN NORMAL RATS. *(E.)* Barbarino, F.; Popescu, S. (Inst. Public Health Med. Res., Cluj, Rumania). *Rev. Roum. Biochim.* 9(4): 293-298, 1972.

3102 QUANTITATIVE DISTRIBUTION OF SEROTONIN IN THE GASTRIC MUCOSA OF THE DOG. *(E.)* Tansy, M. F.; Hohenleitner, F. J.; Seabrook, M. L. (Sch. Dentistry, Temple Univ., Philadelphia, Pa.). *Surg. Gynecol. Obstet.* 136(1):23-26, 1973.

3103 SMALL INTESTINE CONTROL OF GASTRIC SECRETION. *(E.)* Alday, E. S.; Goldsmith, H. S. (Jefferson Med. Coll., Philadelphia, Pa.). *Surg. Gynecol. Obstet.* 136(2):185-193, 1973.

3104 EFFECT OF ESOPHAGEAL LIGATION ON THE GASTRIC SECRETION OF THE PYLORUS-LIGATED RAT. *(E.)* Chayvialle, J. A.; Lambert, R.; Ruet, D. (Edouard Herriot Hosp., Lyon, France). *Biol. Gastroenterol. (Paris)* 5:127-134, 1972.

3105 INTRAGASTRIC pH EVALUATION WITH RADIOTELEMETRY. *(E.)* Johannesson, E.; Magnusson, P. O.; Sjoberg, N. O.; Skov-Jensen, A. (Univ. Hosp., Lund, Sweden). *Scand. J. Gastroenterol.* 8(1):65-69, 1973.

3106 THE EFFECT OF GLUCAGON ON PENTAGASTRIN-INDUCED GASTRIC ACID SECRETION AND SERUM CALCIUM CONCENTRATION IN MAN. *(E.)* Christiansen, J.; Hendel, L. (Glostrup Hosp., Copenhagen, Denmark). *Scand. J. Gastroenterol.* 8(1):81-84, 1973.

3107 SECRETORY FUNCTION AND RELATIVE RESISTANCE OF THE GASTRIC MUCOSA OF THE RAT TO ALLOGENEIC REJECTION. *(E.)* Lee, S.; Edgington, T. S.; Smallwood, C. J.; Thompson, A. G.; Chandler, J. G.; Rosen, H.; Orloff, M. J. (Sch. Med., Univ. California, San Diego). *Transplantation* 14(5): 641-648, 1972.

3108 SECRETION OF GASTRIC HYDROCHLORIC ACID AND SIALIC ACID DURING ADMINISTRATION OF ACETYLSALICYLIC ACID. AN EXPERIMENTAL STUDY IN RATS WITH CHRONIC GASTRIC FISTULA. *(E.)* Carlborg, L.; Dahlgren, S.; Johansson, H.; Lindquist, B.; Rimsten, A. (Univ. Hosp., Uppsala, Sweden). *Upsala J. Med. Sci.* 77(1):62-66, 1972.

3109 DISTURBANCES IN THE ABILITY OF GASTRIC MUCOSAL CELLS TO INDUCE HISTIDINE DECARBOXYLASE AND TO SECRETE HYDROCHLORIC ACID DURING SLOW INFUSION OF PENTAGASTRIN. *(Rus.)* Salganik, R. I.; Argutinskaia, S. V.; Bersimbaev, R. I.; Zimonina, T. V. (Inst. Cytol. Genetics, Novosibirsk, USSR). *Vopr. Med. Khim.* 17(4):390-393, 1972.

3110 EFFECTS OF DIBUTYRYL CYCLIC AMP AND A NEW CYCLIC NUCLEOTIDE ON GASTRIC ACID SECRETION IN THE RAT. *(E.)* Jawaharlal, K.; Berti, F. (Inst. Pharmacol. Pharmacog., Univ. Milan, Italy). *Pharmacol. Res. Commun.* 4(2): 143-149, 1972.

3111 MECHANISM OF THE INHIBITORY ACTION OF ENDOGENOUS CHOLECYSTOKININ AND CAERULEIN ON PENTAGASTRIN-INDUCED GASTRIC SECRETION. *(E.)* Konturek, S. J.; Tasler, J.; Obtulowicz, W. (Med. Acad., Krakow, Poland). *Scand. J. Gastroenterol.* 7(7):657-662, 1972.

3112 EFFECT OF CHEWING GUM ON GASTRIC ACID SECRETION. *(E.)* Hansen, E. A.; Rune, S. J. (Gentofte Hosp., Hellerup, Denmark). *Scand. J. Gastroenterol.* 7(8):733-736, 1972.

3113 DOSE-RESPONSE CURVES FOR ACID OUTPUT TO HISTAMINE AND PENTAGASTRIN DETERMINED BY TWO TECHNIQUES. *(E.)* Emas, S.; Svensson, S. O.

(Gen. Hosp., Malmo, Sweden). *Scand. J. Gastroenterol.* 7(8):751-757, 1972.

3114 VAGAL INFLUENCES ON GASTRIC ACID SECRETION: REVIEW. *(E.)* Emas, S. (Karolinska Hosp., Stockholm, Sweden). *Scand. J. Gastroenterol.* 8(1):1-4, 1973.

3115 A STUDY OF GASTRIC ACID STIMULATING SUBSTANCES IN THE URINE OF PATIENTS WITH LIVER CIRRHOSIS. *(E.)* Schmidt, H. A.; Khalik, F.; Martini, G. A. (Med. Clin., Univ. Marburg/Lahn, Germany). *Acta Hepatogastroenterol.* 19(4):271-276, 1972.

See also 2990, 3162, 3379, 3380, 3382, 3384, 3385, 3386, 3405.

SECRETION AND METABOLISM

Pancreas

3116 CONTROLLED DUCTAL INFUSION AND ABSORPTION FROM THE INTERSTITIUM OF CANINE PANCREAS. *(E.)* Schiller, W. R.; Suriyapa, C.; Mutchler, J. H. W.; Chen, S. C.; Anderson, M. C. (Med. Coll. Ohio, Toledo). *Arch. Surg.* 105(2):356-362, 1972.

Ammonium bicarbonate (0.1 M) buffer solution was infused into the pancreatic duct in adult dogs with and without obstruction of the pancreatic veins or portal vein and with or without obstruction or collection of lymph from the thoracic duct. In the normal canine pancreas, ductal pressures above 40 cm resulted in passage of fluid into the interstitium of gland. Ligation of the thoracic duct in the neck had no effect on intraductal pressure curves. When pancreatic veins were ligated, pancreatic duct pressure built up to a level of about 40 cm buffer, persisted 20-30 min, and dropped to preligation levels. This temporary pressure increase suggests impairment of absorption by the microcirculation. Large volumes of innocuous fluid, such as ammonium bicarbonate buffer, were absorbed by the pancreatic microcirculation, which appears to have extensive collateral outflow pathways. The portal venous bed appeared to be a major route for absorption of fluid from the pancreatic interstitium, while the lymphatic system played a secondary role, and increased in importance when the venous outflow was compromised. These findings suggest that fluid accumulated in the periacinar space is in a state of dynamic equilibrium appears dependent on microcirculation capacity to clear the infused solution.

3117 EFFECT OF VARIOUS IN VIVO TREATMENTS ON THE RATE OF AMYLASE, LIPASE, AND CHYMOTRYPSINOGEN SECRETION BY SLICES OF PIGEON PANCREAS. *(Fr.)* Reggio, H. (Inst. Biol. Chem., Univ. Provence, Marseille, France). *Biochim. Biophys. Acta* 297(1): 81-92, 1972.

During *in vivo* tests on pancreatic slices from 8-week-old pigeons, linear secretion of enzymes occurred for the first 80 minutes. Subsequent deviations indicated degradation of the secretory system. Incubation of the slices with carbamylcholine at 1 x 10^{-5} M doubled amylase secretion *in vitro*. Carbamylcholine administered *in vivo* (0.2 mg i.m.), however, reduced amylase secretion and lipase and chymotrypsinogen activities by about 30% after 5 min and 55% after 45 minutes while stimulating pancreatic and salivary secretions. Fasting, which decreases pancreatic secretion, initially increased amylase activity; however, amylase activities were reduced by 191% after 24 hr and by 28% after 72 hr. Although carbamylcholine increased secretion in fasting birds, it decreased amylase activities by 45% 45 minutes after treatment in pigeons fasted for 72 hr. *In vivo* carbamylcholine treatment 45 minutes before sacrifice halved *in vitro* amylase secretion and lipase and chymotrypsinogen activities in all birds. The kinetics were similar for all 3 enzymes and the results indicate that the secretion rate is a first-order reaction. Decreases in enzyme activities did not parallel decreases in the total protein fraction, indicating that much of the protein fraction is made up of nonsecretory proteins which are unaffected by stimulators.

3118 EFFECTS OF SOME INHIBITORS OF SODIUM TRANSPORT (ADENOSINE TRIPHOSPHATASE INHIBITORS) ON PANCREATIC SECRETION. *(E.)* Guelrud, M.; Rudick, J.; Janowitz, H. D. (Mount Sinai Sch. Med., City Univ. New York, N.Y.). *Gastroenterology* 62(4):540-546, 1972.

Pancreatic electrolyte secretion has usually been considered to involve the active transport of HCO_3^- and the passive diffusion of Na^+ and K^+. Since a (Na^+, K^+) adenosine triphosphatase has been identified in the canine pancreas, the effect of 3 ATPase inhibitors was studied to determine whether the transport of Na^+ might be an active process. These inhibitors, ouabain (0.04 mg/kg), furosemide (1 and 5 mg/kg), and ethacrynic acid (1 and 4 mg/kg), were studied in 5 secretin-stimulated dogs with pancreatic fistulas. All significantly decreased volume flow, HCO_3^-

concentration, Na^+ and K^+ output, and increased enzyme output. The effect began in 10 min, rose to a peak in 60 min, and was over 1 hr later. At the doses used, ouabain had the greatest effect. The effects of furosemide were dose-related, while the effects of ethacrynic acid were not. Thus, pancreatic secretion of electrolytes may be part dependent on an (Na^+, K^+) ATPase system acting on a sodium pump. All 3 inhibitors stimulated protein output; the peak enzyme output for ouabain was lower than that for cholecystokinin-pancreozymin, but the response was more sustained.

3119 EFFECT OF ACETAZOLAMIDE ON HUMAN PANCREATIC SECRETION. *(E.)* Dyck, W. P.; Hightower, N. C.; Janowitz, H. D. (Scott White Mem. Hosp., Temple, Tex.). *Gastroenterology* 62(4): 547-552, 1972.

Effects of 500 mg of acetazolamide on pancreatic exocrine function were studied in 6 human subjects during continuous i.v. infusion of secretin (5 U/kg/hr). Acetazolamide administration markedly depressed volume flow, from 35.7 to 17.5 ml/5 min and bicarbonate concentration from 88 to 51 mEq/liter in the stimulated gland and was accompanied by an increase in chloride concentration from 78 to 105 mEq/liter. Maximum suppression of volume flow and bicarbonate concentration occurred within 15 min and lasted no longer than 30 min. Concentrations of calcium, magnesium, and total protein increased following acetazolamide. These observations help to reconcile human data with recently reported animal studies but do not allow a definitive choice between current hypotheses regarding the factors which determine the relation between secretory flow and electrolyte concentrations in pancreatic secretion.

3120 EXOCRINE SECRETORY RESPONSES OF THE PANCREAS TO INSULIN AND A MEAT MEAL IN DOGS. *(E.)* Gupta, S.; Elder, J. B.; Kay, A. W. (Western Infirmary, Glasgow, Scotland). *Gut* 14(1):54-58, 1973.

Studies in 5 dogs with chronic pancreatic and gastric fistulae have shown that insulin (0.2 U/kg) induced vagal stimulation of the pancreas (gastric fistula open), resulting in protein and bicarbonate outputs very much smaller than those obtained with 400 g meat. However, when the insulin-activated gastric acid secretion was allowed access to the duodenum (gastric fistula closed), peak outputs of both bicarbonate and protein were observed which were closely similar to the response to the meal. Peak bicarbonate output occurred 60 min after insulin injection; peak protein output at 30 min. However, the response to insulin decreased markedly after 2.5 hr, returning almost to basal levels by 4 hr, whereas response to 400 g meat was still markedly increased at 4 hr. These findings suggest that insulin-induced hypoglycemia results in stimulation of the pancreas within the physiological range if gastric acid is allowed into the duodenum with consequent release of secretin.

3121 STIMULATION OF PANCREATIC SECRETION IN MAN BY SECRETIN SNUFF. *(E.)* B'hend, P.; Hadorn, B.; Haldemann, B.; Kleeb, M.; Luthi, H. (Dept. Pediatr., Univ. Bern, Switzerland). *Lancet* 1(7802):509-510, 1973.

The pancreatic response to secretin administered via the nasal mucosa (secretin snuff) was measured in 8 healthy adult subjects (5 male, 3 female; 22-24 yr old). Inhalation of secretin is as effective in stimulating pancreatic secretion as i.v. administration. Each secretin dose caused a pronounced increase in bicarbonate output to the duodenum. The first snuff raised bicarbonate output at 41-80 min to 15.8 times the basal level and at 81-120 min to 5.8 times the basal level. Although the second dose was smaller, it increased bicarbonate output to 16.7 times basal level. Chloride concentration fell to 40-50 mEq/liter after secretin snuff. Secretin snuff could be used therapeutically to treat pancreatic disorders associated with insufficient bicarbonate secretion and duodenal ulcer.

3122 EXOCRINE PANCREAS FUNCTION IN PREMATURE AND FULL TERM NEONATES. *(E.)* Zoppi, G.; Andreotti, G.; Pajno-Ferrara, F.; Njai, D. M.; Gaburro, D. (Clin. Pediatr., Univ. Padua, Verona, Italy). *Pediatr. Res.* 12(6):880-886, 1972.

The basal exocrine pancreatic function has been studied in 36 premature infants (22 female, 14 male; 32-34 weeks gestations) and 8 full-term infants (5 female, 3 male). At birth, enzyme activities (trypsin, lipase, and α-amylase) are significantly lower in premature than in full-term infants. All activities are lower 24 hr after birth than at birth in both premature and full-term infants. At 1 week of age, values for fluid output and enzyme activities are significantly higher for premature than for full-term neonates. In these subjects, consistent modification of exocrine pancreatic secretion seems to be induced by various constituents of the diet. Early administration of small amount of starch stimulated pancreatic α-amylase production, a high-protein diet increased trypsin and lipase production, whereas a high-fat diet alone had no effect on lipase secretion.

3123 PERFUSED ISOLATED DOG PANCREAS. BIOCHEMICAL AND ULTRASTRUCTURAL STUDIES OF THE STIMULATED EXOCRINE SECRETION. *(E.)* Stock, C.; Stoebner, P.; Kachelhoffer, J.; Grenier, J. F. (Res. Unit Exp. Surg. Intestinal Biophysiopathol., N.S.E.R.M., Strasbourg/Hautepierre, France). *Biol. Gastroenterol. (Paris)* 5:153-164, 1972.

3124 PANCREATECTOMY AND LIVER DAMAGE: EFFECTS ON HUMORAL GASTRIC SECRETION IN DOGS. *(E.)* Vadhanasindhu, P.; Dragstedt, II, L. R. (VA Hosp., Des Moines, Iowa). *Arch. Surg.* 105(3):454-456, 1972.

3125 COMPARISON OF THE PANCREATIC EXOCRINE RESPONSE TO TWO TYPES OF SECRETIN. *(Sp.)* Parodi, H. C.; Colombato, L. O.; Curi, C. A. (Posadas Polyclin., Haedo, Argentina). *Acta Gastroenterol. Latinoam.* 4(2):61-65, 1972.

3126 PROBLEMS IN THE MEASUREMENTS OF BILE ACIDS WITH 3α-HYDROXYSTEROID DEHYDROGENASE. *(E.)* Engert, R.; Turner, M. D. (Univ. Rochester Sch. Med. Dentistry, N.Y.). *Anal. Biochem.* 51(2):399-407, 1973.

3127 EFFECT OF ALCOHOL ON TRYPSIN INHIBITING CAPACITY IN PANCREATIC JUICE. *(E.)* Elmslie, R. G.; Mohan Rao, M. (Dept. Surg., Univ. Adelaide, Australia). *Aust. J. Exp. Biol. Med. Sci.* 50(pt. 2):217-223, 1972.

3128 PANCREATIC DOSE RESPONSE TO EXOGENOUS AND ENDOGENOUS CHOLECYSTOKININ IN DOGS. *(E.)* Konturek, S. J.; Radecki, T.; Biernat, J.; Thor, P. (Med. Acad., Krakow, Poland). *Biol. Gastroenterol. (Paris)* 5:145-152, 1972.

3129 DEVELOPMENT OF EXOCRINE ENZYMES IN PANCREATIC RUDIMENTS OF THE CHICK EMBRYO IN THE PRESENCE OF HOMOLOGOUS AND HETEROLOGOUS MESENCHYME. *(Fr.)* Dieterlen-Lievre, F.; Hadorn, H. B. (Lab. Exp. Embryol., Coll. France, Paris). *Wilhelm Roux Arch.* 170(3):175-184, 1972.

3130 HYDROLYSIS OF CONJUGATED FOLIC ACID BY PANCREATIC 'CONJUGASE'. *(E.)* Jagerstad, M.; Lindstrand, K.; Westesson, A. K. (Univ. Hosp., Lund, Sweden). *Scand J. Gastroenterol.* 7(7): 593-597, 1972.

3131 THE EFFECT OF METHACHOLINE ON THE PANCREATIC DUCT OF THE CAT STUDIED WITH A RADIOLOGICAL METHOD. *(E.)* Lenninger, S.; Olin, T. (Inst. Physiol., Univ. Lund, Sweden). *Scand. J. Gastroenterol.* 7(8):727-731, 1972.

See also 3070, 3111, 3220, 3227.

SECRETION AND METABOLISM

Hepatobiliary Tract

3132 EFFECT OF ETHANOL ON THE AMOUNT AND ENZYME ACTIVITIES OF HEPATIC ROUGH AND SMOOTH MICROSOMAL MEMBRANES. *(E.)* Ishii, H.; Joly, J. G.; Lieber, C. S. (VA Hosp., Bronx, N.Y.). *Biochim. Biophys. Acta* 291(2):411-420, 1973.

To study the effect of chronic ethanol administration on the hepatic endoplasmic reticulum, rough and smooth microsomal membranes were separated from the liver of female Sprague-Dawley rats pair-fed a nutritionally adequate diet with 36% of total calories either as ethanol or carbohydrate (controls). After 6 weeks of ethanol feeding a significant increase in microsomal protein was observed in smooth microsomes and a significant decrease in rough microsomes. Phospholipid contents were increased in smooth but not in rough microsomes. The RNA content of rough microsomes decreased, while the RNA content of smooth microsomes was unchanged. Cytochrome P-450 also increased, mainly in smooth microsomes. In controls, the activity of the microsomal ethanol-oxidizing system was distributed about equally among the subfractions, whereas after ethanol feeding it increased mainly in smooth microsomes. Catalase activity after ethanol feeding did not increase; when expressed per mg of microsomal protein, it decreased in smooth microsomes. A reduction of dietary fat content from 35 to 10% of total calories did not influence the effect of ethanol on the hepatic endoplasmic reticulum.

3133 PRODUCTION OF A FATTY LIVER BY ETHANOL IN RHESUS MONKEYS. *(E.)* Ruebner, B. H.; Brayton, M. A.; Freedland, R. A.; Kanayama, R.; Tsao, M. (Natl. Ctr. Primate Biol., Univ. California, Davis). *Lab. Invest.* 27(1):71-75, 1972.

One hundred Kcal/kg of a liquid diet based on Metrecal and with 41% of the calories derived from grain alcohol was force-fed to juvenile rhesus monkeys by nasogastric tube. The protein, fat, and carbohydrate contents of the diet supplied 15, 21, and 23% of the calories, respectively. Control diets contained isocaloric amounts of dextromaltose, glucose, sucrose, or fructose. After 10 days the eight animals which had been fed ethanol developed fatty livers, revealed by light microscopy. Electron microscopy showed mitochondrial swelling and dilation of the endoplasmic reticulum. Liver triglycerides had more than doubled and serum lactic dehydrogenase levels increased almost as much. BSP retention, SGOT, SGPT, sorbitol dehydrogenase, and alkaline phosphatase were unaffected. These changes were not prevented by choline chloride addition (10 mg/Kcal) and were not produced by replacement of ethanol with carbohydrate when a striking proliferation of the hepatic smooth endoplasmic reticulum occurred. The results indicate that the fatty liver produced by ethanol is not caused by a lack of lipotropic factors or dietary imbalance.

3134 AN EFFECT OF ETHANOL ADMINISTRATION ON TRYPTOPHAN OXYGENASE IN THE PERFUSED RAT LIVER. DECREASED ENZYME SYNTHESIS DEPENDENT ON LOW PERFUSATE pH. *(E.)* Morland, J.; Christoffersen, T.; Osnes, J. B.; Seglen, P. O.; Jervell, K. F. (Inst. Pharmacol., Univ. Oslo, Blindern, Norway). *Biochem. Pharmacol.* 21:1849-1859, 1972.

A gradual decrease in the activity of tryptophan oxygenase was observed when the ethanol concentration perfused through isolated rat liver was kept at 30-40 mM for 2 hr. During perfusion with ethanol the pH of the perfusate dropped from 7.2 to 6.2. When this reduction of pH was prevented by adding NaOH to the perfusate, no decrease of tryptophan oxygenase activity occurred. It is concluded that the increase of H^+-ion concentration may play a central role in this effect of ethanol. Experiments with perfused rat livers and liver homogenate indicated that ethanol or metabolites did not cause enzyme inhibition or decreased enzyme activation. Furthermore, increased loss of tryptophan oxygenase to the perfusate or bile after ethanol treatment was not demonstrated. Rat livers perfused with ethanol, cycloheximide, or both showed nearly the same enzyme activity. It is suggested that the reduction of tryptophan oxygenase activity registered after ethanol administration to the perfused liver is most likely due to reduced amount of apoenzyme possibly caused by decreased enzyme synthesis. Ethanol treatment showed some specificity since the activity of tyrosine aminotransferase was not altered.

3135 EFFECT OF CHOLESTEROL FEEDING AND BILIARY OBSTRUCTION ON HEPATIC CHOLESTEROL BIOSYNTHESIS IN THE RAT. *(E.)* Harry, D. S.; Dini, M.; McIntyre, N. (Roy. Free Hosp., London, England). *Biochim. Biophys. Acta* 296(1):209-220, 1973.

Feeding cholesterol to male Sprague-Dawley rats suppressed *in vitro* cholesterol biosynthesis in liver slices. Hepatic and microsomal cholesteryl ester levels rose markedly although hepatic free cholesterol levels hardly changed. After cholesterol feeding was stopped, synthesis returned to normal and microsomal cholesteryl levels decreased accordingly. Biliary obstruction caused hepatic cholesterol biosynthesis to exceed levels of normal diurnal variation; microsomal cholesterol levels remained the same. Cholesterol feeding prior to obstruction inhibited the rise in cholesterol biosynthesis. DL-ethionine given at an initial dose of 100 mg, followed by 75 mg and another 50 mg at 4 and 8 hr, resp., and 1 mg/kg cycloheximide given i.p. (with some rats receiving a second dose of 0.6 mg/kg 48 or 72 hr later) also inhibited cholesterol biosynthesis. The findings suggest that the microsomal cholesteryl ester level may inhibit cholesterol biosynthesis; other factors such as protein synthesis elevate cholesterol synthesis after bile duct ligation.

3136 REVERSAL OF AZATHIOPRINE-INDUCED INHIBITION OF HYPERPLASIA IN REGENERATING LIVER. *(E.)* van Vroonhoven, T. J.; Malamud, D.; Malt, R. A. (Massachusetts Gen. Hosp., Boston). *Transplantation* 14(5):603-607, 1972.

The persistence of the inhibition of DNA synthesis caused by azathioprine in regenerating liver was determined in rats. Labeling of DNA and accretion of total DNA and RNA were studied when: (1) azathioprine was discontinued after being administered during the initial phase of regeneration; (2) a second hepatectomy was performed after an interval without azathioprine; and (3) two hepatectomies were performed after an interval without azathioprine. The initial hepatectomy removed 68% of the liver including the left medial and left lateral lobes; the second hepatectomy removed most of the right lobe, leaving only the caudate lobes. All rats lost 5-7% of their body weight during azathioprine therapy, but regained it rapidly when the drug was stopped. DNA synthesis resumed 24 hr after azathioprine had been discontinued even though the mass of the liver had been restored nearly to normal by enlargement of existing cells. The peak of maximal DNA synthesis was delayed after the second hepatectomy but of equal amplitude in azathioprine treated and solvent alone treated animals, the controls. Profound inhibition of DNA synthesis during 8.5 days of azathioprine administration resulted from systemic debility. Eight days after the first hepatectomy, 82% of the calculated original liver mass was restored with no difference between treated and control rats. After azathioprine therapy liver protein contents were slightly lower and more variable than in controls. Thus, azathioprine-induced inhibition is reversed in less than one day after the drug is stopped, and the proliferative potential of hepatocytes is not permanently impaired. Rational clinical use of azathioprine will require a dosage schedule which inhibits the immune and inflammatory responses while permitting the proliferation of cells that are essential to homeostasis.

3137 EFFECT OF VASOPRESSIN ON HEPATOCYTIC AND DUCTAL BILE FORMATION IN THE DOG. *(E.)* Preisig, R.; Strebel, H.; Egger, G.; Macarol, V. (Dept. Clin. Pharmacol., Univ. Bern, Switzerland). *Experientia* 28(12):1436-1437, 1972.

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FISTULA PATIENTS. *(E.)* Hanson, R. F.; Klein, P. D.; Williams, G. C. (Dept. Med., Univ. Minnesota, Minneapolis). *J. Lipid Res.* 14(1):50-53, 1973.

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3147 PREVENTION OF ETHANOL-MEDIATED REDOX-CHANGES IN MOUSE LIVER BY SODIUM-DIETHYL-BARBITURATE. *(E.)* Rawat, A. K.; Kuriyama, K. (Downstate Med. Ctr., State Univ. New York, Brooklyn). *Life Sci.* [*II*] 11:1055-1062, 1972.

3148 ALTERATIONS OF RAT LIVER LYSOSOMES AND SMOOTH ENDOPLASMIC RETICULUM INDUCED BY THE DIAZAFLUORANTHEN DERIVATIVE AC-3579. III. EFFECTS OF THE DRUG ON PHOSPHOLIPID METABOLISM. *(E.)* Hildebrand, J.; Thys, O.; Gerin, Y. (J. Bordet Inst., Brussels, Belgium). *Lab. Invest.* 28(1):83-86, 1973.

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ACID ON THE TRIGLYCERIDE AND GLYCOGEN ONTENT OF HUMAN LIVER AND SERUM LIPID METABOLITES. *Ger.)* Hanefeld, M.; Jaross, W.; Trubsbach, A.; eonhardt, W. (Carl Gustav Carus Med. Acad., Dresden, ermany). *Z. Gesamte Inn. Med.* 27(15):655-658, 1972.

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3176 THE USE OF A SEMI-SYNTHETIC LIQUID DIET FOR THE SUPPLY OF ETHANOL TO RATS AND ITS EFFECT ON LYSOSOMAL ENZYME ACTIVITIES IN THE LIVER. *(E.)* Pilstrom, L.; Fellenius, E.; Kiessling, K. H. (Inst. Zoophysiol., Univ. Uppsala, Sweden). *Br. J. Nutr.* 29(3):297-306, 1973.

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3184 CHEMICAL STRUCTURE OF THE ENDOPLASMIC RETICULUM AND FUNCTION OF THE MICROSOMAL BIOTRANSFORMATION SYSTEM OF LIVER CELLS IN RATS WITH EXPERIMENTAL CHOLESTASIS. *(Ger.)* Denk, H. (Inst. Pathol. Anat., Univ. Vienna, Austria). *Pathol. Eur.* 7(1):43-65, 1972.

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3188 COMPARATIVE INVESTIGATION OF THE INDUCTION OF CHRONIC HEPATITIS IN RATS. *(Ger.)* Uhlig, K.; Kranz, D.; Schneider, G.; Strassburg, G.; Toft, J. (2nd Med. Clin., Humboldt Univ., Berlin, Germany). *Z. Gesamte Inn. Med.* 27(24): 787-795, 1972.

See also 2971, 2973, 2974, 2975, 3126, 3671, 3704, 3715, 3789.

SECRETION AND METABOLISM

Intestine

3189 CAPILLARY FILTRATION IN ISOLATED, HOMOLOGOUSLY PERFUSED SMALL INTESTINE. *(E.)* Johnson, L. (Univ. Hosp., Uppsala, Sweden). *Acta Chir. Scand.* 139(1):72-78, 1973.

The capillary filtration coefficient of isolated, homologous perfused small intestine was estimated and related to the corresponding values for small intestine with intact innervation, left *in situ*. The study was performed to evaluate possible changes in the circulation, especially the exchange circulation, during the perfusion period. The mean capillary filtration coefficient value during the 3 hr experimental period for an isolated, homologously perfused small intestine was 0.090 ml/min/100g/mm Hg, while the corresponding coefficient for the small intestine with intact innervation was 0.063 ml/min/100g/mmHg. The venous outflow for the small intestine with intact innervation varied between 15-30 ml/min/100 g tissue, whereas for the isolated, homologously perfused small intestine the flow varied between 20-50 ml/min/100 g tissue. During the perfusion period no significant change occurred in capillary area, as evaluated by the capillary filtration coefficient, for either experimental series, indicating that circulatory conditions remained unchanged. Thus, denervation does not appear to have a deleterious effect on blood flow distribution in the intestine.

3190 RELEASE OF ENTEROPEPTIDASE AND OTHER BRUSH-BORDER ENZYMES FROM THE SMALL INTESTINAL WALL IN THE RAT. *(E.)* Nordstrom, C. (Hosp. Lund, Sweden). *Biochim. Biophys. Acta* 289(2):367-377, 1972.

To demonstrate whether a specific release mechanism for enterokinase exists *in vivo*, test solutions were injected into cannulated 3-4 cm intestinal segments in fasted rats. The rats were killed 35 min after the injection. Enzymes were analyzed in the intraluminal fluid washed out with phosphate buffer and in homogenates of the intestinal segments. Enterokinase activity was determined by a method modified for increased sensitivity by addition of bile salts to the activating mixture. Trypsin was removed from samples by Sephadex gel filtration prior to enterokinase analysis. Enzyme activity released (i.e., washed out of the lumen at the end of the experiment) was expressed as a percentage of the total intestinal activity (lumen plus that remaining in the intestinal wall). Following injection of 4-6 U/kg of cholecystokinin and secretin via the femoral vein, the released enterokinase activity averaged 15%; sucrase, 7.5%; trehalase, 10%; maltase, 11%; and alkaline phosphatase, 16%. Introduction of rat bile into the segment produced quantitatively similar results. Perfusion with a bile salt solution resulted in 6% enterokinase release. Collected perfusate fractions with high enzyme release values also had high protein contents. Brush border enzyme release after infusion of pancreatic juice, trypsin, or chymotrypsin was slightly less intense than after hormone injection. Enzyme release occurred whether endogenous bile and pancreatic juice were present or excluded. Enterokinase behaved similarly to other brush border enzymes in all types of release experiments. The findings support the hypothesis that the enzyme release is at least partially due to action on cell fragments trapped in the surface mucus coating and on cells in a pre-desquamating condition in the tips of the villi. Increased motility and fluid secretion probably also contributed to enzyme release.

3191 METABOLISM OF FRUCTOSE IN THE SMALL INTESTINE. I. THE EFFECT OF FRUCTOSE FEEDING ON FRUCTOSE TRANSPORT AND METABOLISM IN RAT SMALL INTESTINE. *(E.)* Mavrias, D. A.; Mayer, R. J. (Univ. Nottingham, Med. Sch., England). *Biochim. Biophys. Acta* 291(2):531-537, 1973.

The metabolism and transport of fructose in the small intestine of male Wistar rats has been measured after fructose feeding for up to 20 days. A preparation of villus epithelial cells was used for the measurements. The diet consisted of fructose (60% w/w), casein (17%), cellulose powder (10%), American Lard (8%), and a vitamin and mineral mix (5%). Fructose was poorly metabolized in rat small intestine. Little conversion to lactate and glucose was observed. Fructose feeding had virtually no effect on the conversion of fructose to lactate or glucose. Fructose feeding for 3 days resulted in approximately a 2-fold increase in the activities of fructokinase and fructose-1-phosphate aldolase in rat small intestine, whereas after fructose feeding for 20 days these enzyme activities were not significantly different from enzyme activities in the small intestine of animals fed on normal laboratory chow. The rate of fructose uptake in segments of intestine taken from animals fed for 3 days on the fructose diet was about twice that of animals fed on normal laboratory chow. The rate of fructose uptake was not further altered in animals given the fructose diet for 15 days.

3192 NUCLEAR AND CYTOPLASMIC RECEPTORS FOR 1,25-DIHYDROXY-CHOLECALCIFEROL IN INTESTINAL MUCOSA. *(E.)* Brumbaugh, P. F.; Haussler, M. R. (Coll. Med., Univ. Arizona, Tucson). *Biochem. Biophys. Res. Commun.* 51(1):74-80, 1973.

Intestinal mucosa homogenates and whole intestinal tissue from White Leghorn cockerels that had been raised on a vitamin D-deficient diet for 3-4 weeks were incubated *in vitro* with the apparent hormonal form of cholecalciferol, 1,25-dihydroxy-cholecalciferol (DHCC). After 40-70 min, DHCC was specifically associated with the nuclear chromatin fraction. At 0°C this sterol remains bound to the cytosol fraction and a dramatic movement to the nuclear chromatin occurs at 37°C, indicating temperature dependence of the subcellular localization of the sterol. For transportation of the hormone to the intestinal chromatin fraction isolated intestinal cytosol, previously incubated with DHCC, is required. Cytosol fractions from other tissues are ineffective mediators of this sterol migration. It is concluded that intestinal cytosol contains a specific receptor which functions to transport DHCC to the nucleus, its probable site of action.

3193 METABOLISM OF FRUCTOSE IN THE SMALL INTESTINE. II. THE EFFECT OF FRUCTOSE FEEDING ON FRUCTOSE TRANSPORT AND METABOLISM IN GUINEA PIG SMALL INTESTINE. *(E.)* Mavrias, D. A.; Mayer, R. J. (Univ. Nottingham, Med. Sch., England). *Biochim. Biophys. Acta* 291(2):538-544, 1973.

The metabolism and transport of fructose in guinea pig small intestine has been measured after fructose feeding for up to 20 days. A preparation of villus epithelial cells was used for the measurements. Most of the fructose metabolized by guinea pig small intestine appears as glucose, the rest as lactate. Fructose feeding had no effect on the protein content of the epithelial cell preparation. However, the DNA content decreased significantly after 10 days on the fructose diet, reaching 25% of the initial level after 15 days. Fructose metabolism initially decreased on fructose feeding. Subsequently a gradual increase occurred, very pronounced after 10 days on the diet. Fructose feeding for 3 days caused no change in the activities of fructokinase and fructose-1-phosphate aldolase in the guinea pig small intestine. The rate of fructose uptake in segments of intestine taken from animals fed for 3 days was the same as that of animals fed on normal laboratory chow. There was a slight increase in the rate of fructose uptake in intestinal segments taken from animals fed the fructose diet for 20 days. Histological sections of intestine taken from animals fed the fructose diet for 20 days showed an accumulation of a yellowish material in the subepithelial region at the tips of the villi. This material appeared to be present within macrophages and is perhaps a protein containing a carbohydrate component.

3194 ANALYSIS OF BILE ACIDS AND THEIR CONJUGATES IN JEJUNAL JUICE BY THIN-LAYER CHROMATOGRAPHY AND DIRECT DENSITOMETRY.

(E.) O'Moore, R. R. L.; Percy-Robb, I. W. (Roy. Infirm., Edinburgh, Scotland). *Clin. Chim. Acta* 43(1):39-47, 1973.

A method employing direct densitometry for developed thin-layer chromatograms for the separation and determination of bile acids and their conjugates from jejunal juice has been devised. The bile acids were separated on silica gel G and individual bile acids developed on the chromatogram with a spray reagent. The method separates unconjugated from conjugated acids and also separates conjugated tri- and dihydroxy acids. The method has been evaluated comparing it with the specific 3-hydroxysteroid dehydrogenase technique. The precision of the method is 4-6%, provided an adequate amount of each individual conjugate is applied to the chromatogram.

3195 UPTAKE AND REDUCTION OF RADIOACTIVE FOLATE BY EVERTED SACS OF RAT SMALL INTESTINE.

(E.) Selhub, J.; Brin, H.; Grossowicz, N. (Hebrew Univ. Hadassah Med. Sch., Jerusalem, Israel). *Eur. J. Biochem.* 33(3):433-438, 1973.

Uptake, reduction, and methylation of 2-^{14}C-pteroylglutamic acid by everted sacs of rat small intestine was studied. A net transport of pteroylglutamic acid from the mucosal to the serosal side was found at initial concentrations not exceeding 7 μM under conditions of zero initial concentration gradient. Using a simplified chromatographic procedure for estimation of reduced folates, it was found that part of the transported pteroylglutamic acid was converted to reduced forms, tentatively identified as tetrahydropteroylglutamic acid and its methyl and formyl derivatives. Reduction of pteroylglutamic acid occurred throughout the small intestine and was time and concentration dependent with an apparent K_m of 1.55 μM. The reduction of pteroylglutamic acid was inhibited by low concentrations of methotrexate (23 nanomols), but this did not affect its transport. A much higher concentration (3 μM) of methotrexate decreased the accumulation of folates in the tissue without significantly affecting the vitamin concentration in the serosal solution.

3196 RABBIT CHOLERA: EFFECTS OF CYCLOHEXIMIDE ON NET WATER AND ION FLUXES AND TRANSMURAL ELECTRIC POTENTIALS.

(E.) Moritz, M.; Iber, F. L.; Moore, E. W. (Health Sci. Ctr., Temple Univ., Philadelphia, Pa.). *Gastroenterology* 63(1):76-82, 1972.

Effects of cycloheximide on net H_2O and electrolyte fluxes and transmural electric potentials were studied *in vivo* in paired loops of male rabbit jejunum randomly incubated with either cholera toxin or control peptone broth. A profound secretion of H_2O, Na, and HCO_3, and slight secretion of Cl in response to cholera, when compared with paired control loops was evident in untreated animals. Pretreatment with cycloheximide (20 mg/kg i.v.) abolished secretion of H_2O and Cl in response to cholera, and greatly reduced Na and HCO_3 secretion. Over-all reduction in net ion flux was about 75%; inhibition of anion secretion was about equal for Cl and HCO_3. Potassium absorption was significantly decreased in both control and cholera segments in pretreated animals when compared with untreated controls. Transmural electric potentials did not reflect either the direction or magnitude of net H_2O or ion fluxes. When cycloheximide was administered i.v. 1 hr before the intraluminal instillation of cholera toxin, the transmural electric potential was consistently more negative than in controls. When cycloheximide was administered i.v. 4 hr before the cholera toxin, a pronounced increase in mucosal negativity resulted in both control and cholera segments. It is concluded that: pretreatment with cycloheximide effectively blocks the response to cholera toxin; potassium absorption is decreased in pretreated animals, otherwise the drug has no significant effects on net water or ion fluxes in control segments; the drug has effects on transmural potentials unrelated to the severity of the cholera response; and drug effects on net anion fluxes are about equal for Cl and HCO_3.

3197 STIMULATION OF COLONIC SECRETION OF WATER AND ELECTROLYTES BY HYDROXY FATTY ACIDS.

(E.) Bright-Asare, P.; Binder, H. J. (Dept. Intern. Med., Yale Univ., New Haven, Conn.). *Gastroenterology* 64(1):81-88, 1973.

he effect of hydroxy fatty acids on colonic waters
nd electrolyte movement was studied in the rat
olon *in vivo* with a continuous perfusion technique.
icinoleic acid perfusion (1 mM) caused a decrease
n net water, sodium, and chloride absorption but
et secretion was not observed. Perfusion with 2 mM
icinoleic acid resulted in net secretion of water,
odium, and chloride and is accompanied by a
arked increase in mucosal permeability, as determined
y inulin clearance which increased to 12.35 μliters/
in, and a significant decrease in electrical poten-
ial difference 20-40 min after start of infusion.
leic acid (2 mM), which did not cause net secretion
ut did inhibit net absorption, induced similar
lterations in electrical potential difference and
nulin clearance. In all animals perfused with
icinoleic acid, the colonic mucosa showed marked
epletion of intracellular mucin. This was not
bserved in saline, sodium taurocholate, or oleic
cid perfusion. These results suggests that hydroxy
atty acids may be a mediator of the diarrhea in
teatorrhea.

198 EFFECT OF ETHANOL ON ENDOGENOUS LIPID AND LIPOPROTEIN METABOLISM IN SMALL INTESTINE.

E.) Mistilis, S. P.; Ockner, R. K. (Univ. Cali-
ornia Sch. Med., San Francisco). *J. Lab. Clin.
ed.* 80(1):34-46, 1972.

asting male Sprague-Dawley rats received constant
ntraduodenal infusions of ethanol (5 g/kg) or of
socaloric amounts of glucose during a 0-8 hr inter-
al. Mucosal triglyceride levels increased 4-fold
fter intraduodenal ethanol, but only 2-fold after
.v. ethanol. After intraduodenal ethanol, intesti-
al lymph output of endogenous triglyceride increased
% at 16-24 hr, compared both to 0-8 levels and to
-24 hr levels in glucose-infused rats; the tri-
lyceride was carried primarily in very low density
ipoproteins (VLDL), as shown by preparative ultra-
entrifugation, agarose gel electrophoresis, and
mpositional analysis. Lymph output of phos-
olipid and cholesterol increased simultaneously with
iglyceride, and the increased lipid output could
t be related to changes in lymph volume or pro-
in. However, it was temporally related to ele-
tion of plasma triglyceride in ethanol-infused
ts without fistulas, consistent with the concept
at intestinal lymph lipoproteins may contribute
ethanol-induced hyperlipidemia. These experiments
monstrated that intraduodenal administration of
hanol causes changes which include an increase in
cosal triglyceride concentration and in the pro-
ction of endogenous triglyceride-rich lipoproteins
small intestine. The entry of this nondietary
testinal lipid into plasma may participate, along
th other endogenous lipid sources, in the patho-
nesis of ethanol-induced hyperlipidemia.

99 STUDIES ON MICELLAR FATTY ACID UPTAKE BY RAT INTESTINE IN VITRO WITH REFERENCE THE ROLE OF BILE.

(E.) Rampone, A. J. (Univ. Oregon Med. Sch., Portland). *J. Physiol. (Lond.)* 229(2):495-503, 1973.

The uptake of oleic acid and esterification to triglyceride in micellar form was studied in rat intestine *in vitro*. Sacs of the upper half of the everted intestine taken from bile fistula rats were incubated in a buffered solution containing monoolein, ^{14}C-oleic acid, and sodium taurocholate in concentrations exceeding the critical micellar concentration. Increasing the sodium taurocholate concentration enhanced both uptake and esterification at 37°C incubation temperature. Uptake decreased at all sodium taurocholate concentrations when whole rat bile was added, but the effect on esterification was only slight and variable. At 0°C incubation temperature esterification was suppressed but there was no effect on uptake. At 0° incubation temperature adding whole bile still decreased fatty acid uptake but had no effect on esterification. It is concluded that intestinal fatty acid uptake from micelles is a process requiring no energy and that a non-bile salt component in bile exists which can suppress this process. Lecithin may be this non-bile salt component and may suppress uptake by interacting either with the micelles or with the epithelial membrane to reduce fatty acid permeability.

3200 EMBRYONIC CHICK INTESTINE IN ORGAN CULTURE: RESPONSE TO VITAMIN D$_3$ AND ITS METABOLITES.

(E.) Corradino, R. A. (New York State Veterinary Coll., Cornell Univ., Ithaca). *Science* 179(4071): 402-405, 1973.

The duodenum from 20-day old chick embryos maintained in organ culture responded to vitamin D$_3$ and its metabolites 25-hydroxycholecalciferol (HCC) and 1,25-dihydroxycholecalciferol (DHCC) by synthesis of calcium-binding protein and enhanced ^{45}Ca uptake. The minimum effective concentration of either vitamin D$_3$ or HCC was only 6.5nM for induction of detectable calcium-binding protein synthesis and 65 nM for enhancement of ^{45}Ca uptake. At 65 nM, HCC was 1.4 times as effective as vitamin D$_3$ in inducing calcium-binding protein synthesis and 2 times as effective in stimulating ^{45}Ca uptake. Calcium-binding protein induction by 65 nM DHCC was 10 times greater than by 65 nM vitamin D$_3$ and 7 times greater than that by 65 nM HCC. The minimum effective concentration of DHCC for induction of detectable calcium-binding protein synthesis was no more than 6.5 pM, making this one of the most potent biologically derived substances known.

3201 HISTOCHEMICAL ACTIVITY OF MONOAMINOOXIDASE AND CHOLINESTERASE IN THE INTESTINAL WALL OF RABBITS AND PIGS.

(E.) Radymska-Wawrzyniak, K.; Nagorna-Stasiak, B. (Higher Sch. Agr., Lublin, Poland). *Acta Physiol. Pol.* 23(1):169-174, 1972.

3202 INHIBITION OF MITOCHONDRIAL-PROTEIN SYNTHESIS IN RAT SMALL-INTESTINAL EPITHELIUM. *(E.)* De Jonge, H. R.; Hulsmann, W. C. (Med. Fac., Rotterdam, Netherlands). *Eur. J. Biochem.* 32(2):356-364, 1973.

3203 STUDIES ON THE MECHANISM OF ACTION OF CALCIFEROL. V. TURNOVER TIME OF CHICK INTESTINAL EPITHELIAL CELLS IN RELATION TO THE INTESTINAL ACTION OF VITAMIN D. *(E.)* Spielvogel, A. M.; Farley, R. D.; Norman, A. W. (Dept. Biochem., Univ. California, Riverside). *Exp. Cell Res.* 74(2): 359-366, 1972.

3204 COMPARISON OF STEROL COMPOSITION AND TRANSFORMATION IN CHICKEN AND PIGEON INTESTINES. *(E.)* Subbiah, M. T. R.; Kottke, B. A. (Mayo Clin., Rochester, Minn.). *Experientia* 28(12):1431-1432, 1972.

3205 MOTILIN, A GASTRIC MOTOR ACTIVITY-STIMULATING POLYPEPTIDE: FINAL PURIFICATION, AMINO ACID COMPOSITION, AND C-TERMINAL RESIDUES. *(E.)* Brown, J. C.; Cook, M. A.; Dryburgh, J. R. (Dept. Physiol., Univ. British Columbia, Vancouver, Canada). *Gastroenterology* 62(3):401-404, 1972.

3206 BIOLOGICAL ACTIVITIES OF SYNTHETIC PEPTIDES CORRESPONDING TO FRAGMENTS OF AND TO THE ENTIRE SEQUENCE OF THE VASOACTIVE INTESTINAL PEPTIDE. *(E.)* Bodanszky, M.; Klausner, Y. S.; Said, S. I. (Case Western Reserve Univ., Cleveland, Ohio). *Proc. Natl. Acad. Sci. USA* 70(2):382-384, 1973.

3207 SERUM CALCIUM ALTERATIONS PRODUCED BY ENTERECTOMY IN NORMAL AND PARATHYROIDECTOMIZED DOGS. *(E.)* Deysine, M.; Mraovitch, S.; Mader, M.; Koch, M. (Long Island Jewish/Hillside Med. Ctr., New Hyde Park, N.Y.). *Surg. Gynecol. Obstet.* 136(3):421-424, 1973.

3208 IDENTIFICATION OF TWO CALCIUM-BINDING PROTEINS IN HUMAN SMALL INTESTINE: A PRELIMINARY REPORT. *(E.)* Alpers, D. H.; Lee, S. W.; Avioli, L. V. (Jewish Hosp. St. Louis, Mo.). *Gastroenterology* 62(4):559-564, 1972.

3209 STEROIDGLUCURONYLTRANSFERASES, III. OESTRADIOL-17β 3-GLUCURONYLTRANSFERASE OF THE MITOCHONDRIA OF PIG INTESTINE. *(E.)* Schumacher, R.; Rao, G. S.; Rao, M. L.; Breuer, H. (Inst. Clin. Biochem. Clin. Chem., Univ. Bonn, Germany). *Hoppe Seylers Z. Physiol. Chem.* 353(11): 1784-1788, 1972.

3210 STEROIDGLUCURONYLTRANSFERASES, IV. LOCALIZATION OF THE OESTRADIOL-17β 3-GLUCURONYLTRANSFERASE IN THE OUTER MEMBRANE OF THE MITOCHONDRIA OF PIG INTESTINE. *(E.)* Rao, G. S.; Schumacher, R.; Rao, M. L.; Breuer, H. (Inst. Clin. Biochem. Clin. Chem., Univ. Bonn. Germany). *Hoppe Seylers Z. Physiol. Chem.* 353(11): 353(11):1789-1797, 1972.

3211 THE RELATIONSHIP BETWEEN DURATION OF EXPOSURE TO CHOLERA TOXIN AND THE SECRETORY RESPONSE OF RABBIT JEJUNAL MUCOSA. *(E.)* Goodgame, J. T.; Banwell, J. G.; Hendrix, T. R. (Johns Hopkins Banwell, J. G.; Hendrix, T. R. (Johns Hopkins Univ. Sch. Med., Baltimore, Md.). *Johns Hopkins Med. J.* 132(2):117-126, 1973.

3212 ORIGIN OF THE HIGH SATURATED FATTY ACID CONTENT OF RAT FECAL LIPIDS. *(E.)* Grigor, M. R.; Dunckley, G. G. (Med. Res. Council New Zealand, Dunedin). *Lipids* 8(2):53-55, 1973.

3213 ILEOCECAL VALVE SUBSTITUTES AS BACTERIOLOGIC BARRIERS. *(E.)* Richardson, J. D.; Griffen, Jr., W. O. (Univ. Kentucky Coll. Med., Lexington). *Am. J. Surg.* 123(2):149-153, 1972.

See also 2982, 2986, 3007, 3015, 3022, 3047, 3221, 3228.

GENERAL

3214 INTESTINAL VASODILATATION IN RESPONSE TO TRANSMURAL ELECTRICAL FIELD STIMULATION. *(E.)* Biber, B.; Fara, J.; Lundgren, O. (Fac. Med., Univ. Goteborg, Sweden). *Acta Physiol. Scand.* 87(2):277-282, 1973.

Electrical field stimulation of the jejunum *in vivo* in cats induces a 60-150% increase in total intestinal blood flow. This becomes evident in 5 sec and usually fully developed in 10-15 sec, returning to control levels 20 sec after stimulation ceased. The vasodilatory response to field stimulation is blocked by tetrodotoxin (2-6 μg/kg) and lidocaine but is unaffected by extrinsic denervation of the

ntestine; by atropine (1 mg/kg i.v.), phenoxybenz-
mine (2 mg/kg), and propranolol (1 mg/kg); and also
y cross perfusion of the stimulated intestine from
donor animal. These findings suggest the parti-
ipation of a local nervous structure in the control
f intestinal blood flow.

215 INTESTINAL ISCHEMIA AND SOME ORGANIC SUBSTANCES IN SERUM AND ABDOMINAL FLUID.

.) Rush, Jr., B. F.; Host, W. R.; Fewel, J.;
sieh, J. (Coll. Med. Dentistry New Jersey, Newark).
rch. Surg. 105(2):151-157, 1972.

erum and abdominal fluid concentrations of 12 sub-
tances were evaluated in groups of male and female
ngrel dogs who had ischemic obstruction, simple
ntestinal obstruction, or sham operation. One
roup was used as a control. No significant changes
ere found in serum. In abdominal fluid, the fol-
wing changes were noted: LDH increased from 18.3
136.9 U/ml (simple obstruction group), and from
.2 to 228.7 U/ml in 2 hr (ischemic obstruction).
dolase rose from 4.13 to 13.62 U/ml in 3.5 hr
simple obstruction), and from 1.99 to 16.28 U/ml
3.5 hr (ischemic obstruction). Intestinal
kaline phosphatase rose steadily from 0.11 to 0.89
/ml, but was not significantly different from con-
rols until 3.5 hr after start of the procedure.
here was a significant increase in both the control
roup and the simple obstruction group after 3.5
. Lactic acid rose from 0.226 μM/ml to 1.636 μM
the ischemic group with significant increase
ccurring in the 1st hr. At 24 hr erratic changes
ere noted in plasma and abdominal fluid levels
all 4 enzymes.

216 EFFECT OF BILE SALTS AND ASPIRIN ON THE GASTRIC MUCOSAL BLOOD FLOW. *(E.)*

'Brien, P.; Silen, W. (Beth Israel Hosp., Boston,
ss.). *Gastroenterology* 64(2):246-253, 1973.

astric mucosal blood flow in canine vagally dener-
ated fundic pouches was studied with the aminopyrine
learance technique before, during, and after per-
usion of the pouches with bile salt or acetylsali-
lic acid. Solutions containing 40 mM and 10 mM
sodium taurocholate in 80 mEq/liter of H^+ decreased
e gastric mucosal blood flow to 19.6% and 49.5% of
ntrol values, resp., and caused increased back diffu-
on of H^+. Blood flow was reduced to similar low
vels, but significant back diffusion of H^+ did not
cur when the perfusions were repeated with low H^+
5 and 9 mEq/liter) solutions containing 40 and 10 mM
dium taurocholate. Perfusion with a 20 mM solution
aspirin reduced the blood flow to 29% of control
lues. When a 20 mM solution of aspirin was in-
illed into the pouch without constant perfusion,
e blood flow was reduced to 57% of control values,
t back diffusion of H^+ was significantly greater
an with the constant perfusion technique. Dis-
ption of the mucosal barrier with sodium tauro-
olate did not cause significant disappearance
aminopyrine instilled in the pouch. It is con-
uded that bile salts and aspirin caused marked reduction in the gastric mucosal blood flow. This change appears unrelated to changes in ionic permeability of the mucosa. Instillation of aspirin solution with its consequent distention of the pouch alters the vascular response of the mucosa and its ionic integrity. This demonstration that bile salts can decrease mucosal blood flow suggests a mechanism for the pathogenesis of gastric ulcers.

3217 THE MEASUREMENT OF DOG GASTRIC MUCOSAL BLOOD FLOW BY RADIOACTIVE ANILINE CLEARANCE COMPARED WITH AMIDOPYRINE CLEARANCE. *(E.)*

Curwain, B. P.; Holton, P. (St. Mary's Hosp. Med. Sch., London, England). *J. Physiol. (Lond.)* 229(1):115-131, 1973.

Methods for the estimation of radioactive aniline in body fluids are described. The recovery of aniline added to blood, plasma, and gastric juice was over 92, 96, and 98%, resp., of the recovery from saline. In the doses used aniline only caused methemoglobin concentrations of 6-11% of total hemoglobin. Aniline clearance paralleled acid secretion from Heidenbain pouches in both conscious and anesthetized dogs; in the former, however, the ratio of aniline clearance to acid secretion was significantly higher for histamine stimulation compared to pentagastrin stimulation. Aniline clearance was about 80% of aminopyrine clearance compared in the same dogs. When aniline clearance was corrected for plasma binding, aniline and aminopyrine clearances were equal. An infusion of 0.25 μg/kg/min isoprenaline or isoprenaline sulfate during secretion decreased clearances of both aniline and aminopyrine secretion, increased ratios of clearance to secretion, and inhibited secretion. Norepinephrine (1-10 μg/kg) decreased secretion and clearance of both markers. It was evident that both aniline and aminopyrine must be removed from the cells as well as from the plasma in mucosal circulation. The proportions of aniline to bound plasma proteins were 26.7% and 24.8% measured by equilibrium dialysis and ultrafiltration, resp.

3218 INCREASED VASCULAR RESISTANCE BY PROSTAGLANDINS B_1 AND B_2 IN THE ISOLATED RAT PANCREAS. *(E.)*

Saunders, R. N.; Moser, C. A. (G. D. Searle and Co., Skokie, Ill.). *Nature (New Biol.)* 237(78):285, 1972.

Prostaglandins B_1 and B_2 increased vascular resistance to perfusion in the isolated rat pancreas, suggesting that a reduction in pancreatic blood flow could occur *in vivo* with these agents. The response was dose-related and linear between 0.1-10 μg/ml. Response to prostaglandin B_2 was of the same order of magnitude as with epinephrine and norepinephrine. Prostaglandins B_1 and B_2 exhibited weak activity on systemic blood pressure, suggesting they might act indirectly by causing release of a vasoconstrictor from the pancreas. In the presence of 1 μg/ml phentolamine, the 2 pressor compounds had a differential effect, suggesting at least some of the pressor activity of prostaglandin B_2 is independent of the release of stored norepinephrine.

3219 NONHUMAN PRIMATE ANIMALS FOR RESEARCH IN GASTROINTESTINAL PROBLEMS. *(E.)* Goldsmith, E. I.; Glenn, F. (New York Hosp. Cornell Med. Ctr., N.Y.). *Am. J. Surg.* 125(1):89-98, 1973.

3220 PANCREATIC TRANSPLANTATION WITHOUT DUODENUM IN THE DOG. *(E.)* Aquino, C.; Ruiz, J. O.; Schultz, L. S.; Lillehei, R. C. (Univ. Minnesota Health Sci. Ctr., Minneapolis). *Am. J. Surg.* 125(2):240-244, 1973.

3221 INTRALUMINAL GLUCOSE: SUBSTRATE FOR ISCHEMIC INTESTINE. *(E.)* McArdle, A. H.; Chiu, C. J.; Gurd, F. N. (Montreal Gen. Hosp., Canada). *Arch. Surg.* 105(3):441-445, 1972.

3222 HYPOCALCEMIC EFFECT OF PENTAGASTRIN AND RELATED GASTROINTESTINAL HORMONAL PEPTIDES IN THE RAT. *(E.)* Cooper, C. W.; Biggerstaff, C. R.; Wiseman, C. W.; Carlone, M. F. (Sch. Med. Univ. North Carolina, Chapel Hill). *Endocrinology* 91(6): 1455-1461, 1972.

3223 ELECTROPHORETIC SEPARATION AND DIFFERENTIATION OF ENZYMES FROM HUMAN AND FROM PORCINE LIVER. *(E.)* Baron, D. N.; Buttery, J. E. (Roy. Free Hosp. Sch. Med., London, England). *J. Clin. Pathol.* 25(5):415-421, 1972.

3224 MEASUREMENT OF GASTROINTESTINAL BLOOD LOSS IN THE RAT: THE EFFECT OF ASPIRIN, PHENYLBUTAZONE AND SECLAZONE. *(E.)* Edelson, J.; Douglas, J. F. (Wallace Lab., Cranbury, N.J.). *J. Pharmacol. Exp. Ther.* 184(2):449-452, 1973.

3225 HEPATIC HEMODYNAMICS IN CANINE CIRRHOSIS AFTER PORTACAVAL TRANSPOSITION. *(E.)* Kreuzer, W.; Schenk, Jr., W. G. (Dept. Surg., State Univ. New York, Buffalo). *J. Surg. Res.* 3:113-119, 1972.

3226 STUDY OF LIVER HEMODYNAMICS WITH REGARD TO AUXILIARY TRANSPLANTATION OF THE LIVER. II. CHANGES CAUSED BY SPLENOCAVAL AND SPLENOMESENTERICOCAVAL SHUNTS. HISTOLOGICAL RESULTS. *(Fr.)* Gelis, C.; Serrou, B.; Michel, H.; Paran, M.; Solassol, C.; Romieu, C. (Fac. Pharm., Montpellier, France). *Trav. Soc. Pharm. Montpellier* 32(4):309-312, 1972.

3227 EVALUATION OF THE FUNCTION OF DUODENO-PANCREATIC ALLOTRANSPLANTS IN THE RECIPIENT. *(Ger.)* Zimmermann, G.; Boeckl, O.; Fritzsche, H.; Galvan, G.; Hell, E.; Kroiss, A.; Paulowitz, H. P. (Provincial Hosp., Salzburg, Austria). *Wien. Klin. Wochenschr.* 84(1):8-12, 1972.

3228 FACTORS AFFECTING DIMETHYLNITROSAMINE FORMATION FROM SIMPLE PRECURSORS BY RAT INTESTINAL BACTERIA. *(E.)* Klubes, P.; Cerna, I.; Rabinowitz, A. D.; Jondorf, W. R. (George Washington Univ. Sch. Med., Washington, D.C.). *Food Cosmet. Toxicol.* 10(6):757-767, 1972.

3229 KINETICS OF THE TASTE RESPONSE TO CHEMICAL STIMULATION: A THEORY OF ACID TASTE IN MAN. *(E.)* Makhlouf, G. M.; Blum, A. L. (Med. Coll. Virginia, Richmond). *Gastroenterology* 63(1):67-75, 1972.

3230 REGIONAL DISTRIBUTION OF FELINE ESOPHAGEAL BLOOD FLOW. *(E.)* Harell, G. S.; DeNardo, G. L.; Archibald, R. W. R.; Bradley, B. R.; Zboralske, F. F. (Stanford Univ. Sch. Med., Calif.). *Gastroenterology* 63(4):627-633, 1972.

3231 METABOLISM OF XENOBIOTICS BY STRAINS OF INTESTINAL BACTERIA. *(E.)* Soleim, H. A.; Scheline, R. R. (Dept. Pharmacol., Univ. Bergen, Norway). *Acta Pharmacol. Toxicol.* 31:471-480, 1972.

See also 2992, 3048, 3049, 3058.

DIAGNOSTIC PROCEDURES

3232 THE BURGE TEST FOR COMPLETENESS OF VAGOTOMY. *(E.)* Inberg, K. R.; Moller, .; Tavela, K.; Kekomaki, M. P. (Univ. Hosp., elsinki, Finland). *Acta Chir. Scand.* 139(1): 6-71, 1973.

he electrical stimulation (Burge) test was applied s a routine procedure in a consecutive series of 01 patients submitted to selective vagotomy and rainage operation for chronic duodenal ulcer. hirty-seven patients (32 male, 5 female; 26-68 yr ld) (Group A) were treated with total selective agotomy and 64 patients (48 male, 16 female; 25-67 r old) (Group B) with proximal selective vagal ection. In Group A associated conditions included yloric stenosis and 3 cases of hiatal hernia with sophagitis. In Group B associated conditions ncluded antral ulcers (1 patient), a few cases of yloric stenosis, and benign lesser curvature ulcer 1 patient). The test procedure failed to provide nformation for 27% in Group A and 4% in Group B. he Burge test was helpful in detecting residual agal trunks in 13% in Group A and 25% in Group B. se of the intraoperative test made in possible to pply a new technique of proximal selective vagotomy ith good clinical results. The failure rate tends o decrease with increasing experience of the Burge est. No false positive results were obtained but it as not certain whether false negative results ccurred. The results of 82 insulin tests were s follows: 76% negative responses in Group A nd 75% in Group B, 3% early positive responses in roup A and 3% in Group B, 20% late positive reponses in Group A and 20% in Group B. The Burge est is useful for detecting incomplete vagal section espite an occasional failure and a certain discrepncy between the results of the electrical stimuation and insulin tests.

233 COLONOSCOPY AND DOUBLE CONTRAST BARIUM ENEMA EXAMINATION IN CHRONIC ULCERATIVE OLITIS. *(E.)* Warwick, R. R. G.; Sumerling, M. D.; ilmour, H. M.; Shearman, D. J. C. (Univ. Dept. her., Edinburgh, Scotland). *Am. J. Roentgenol. adium Ther. Nucl. Med.* 117(2):292-296, 1973.

leven patients, 10 of whom had ulcerative colitis r proctitis of at least 5 yr duration, were kamined by double contrast enema and by colonoscopy ith multiple biopsies of the colonic mucosa. oentgenology underestimated the extent or severity f the disease as assessed by biopsy in 8 of 11 atients e.g., in 1 patient with roentgenologic vidence of involvement of the ascending and proxial transverse colon, biopsies showed a total olitis. In 2 patients, colonoscopy detected seudopolyps and polyps which were not revealed y the double contrast barium enema examination. evere mucosal changes tend to be masked by debris the colon. However, as occurred in 1 of these atients, roentgenology demonstrated loss of austra and narrowing due to fibrosis, both of ich are difficult to assess visually at colonocopy. Thus, to some extent, the techniques are omplementary.

3234 COMBINED PERCUTANEOUS TRANSHEPATIC CHOLANGIOGRAPHY (PTC) AND SELECTIVE VISCERAL ANGIOGRAPHY (SVA) IN OBSTRUCTIVE JAUNDICE. *(E.)* Gothlin, J.; Masoor, M.; Tranberg, K. G. (Dept. Diagn. Radiol., Univ. Lund, Sweden). *Amer. J. Roentgenol. Radium Ther. Nucl. Med.* 117(2):419-425, 1973.

Percutaneous transhepatic cholangiography and selective visceral angiography were performed on 50 patients, aged 38-82 yr, with suspected or known obstructive jaundice. Of these 50 patients, 72% had tumors; 86% were diagnosed preoperatively by percutaneous transhepatic cholangiography and 89% by selective visceral angiography. In 1 patient with recurrent carcinoma of the extrahepatic bile ducts and in 2 with choledocholithiasis neither technique gave the correct diagnosis. Percutaneous transhepatic cholangiography failed to diagnose correctly hepatoma (1), periampullary carcinoma of the liver hilus (1), abscess of the liver hilus (1), periampullary carcinoma with liver metastases (1), and cystadenoma of the pancreas (1); selective visceral angiography gave correct diagnoses in all cases. Selective visceral angiography failed to diagnose correctly carcinoma of the extrahepatic bile ducts (1), postoperative stenosis of the common hepatic duct (3), postoperative fistula of the common hepatic duct (1), choledocholithiasis (2), and periampullary carcinoma (2); percutaneous transhepatic cholangiography diagnosed all these cases correctly. These findings indicate that transhepatic cholangiography is suitable for revealing the site of obstruction and the anatomy of the bile ducts while selective visceral angiography shows the origin and extent of the lesion, possible hepatic metastases, and involvement of adjacent structures. It is recommended that both procedures be used on all patients with known or suspected obstructive jaundice not obviously caused by choledocholithiasis, provided that the general condition of the patient permits laparotomy.

3235 EMERGENCY INTRAVENOUS CHOLANGIOGRAPHY IN PATIENTS WITH ACUTE ABDOMINAL PAIN. *(E.)* Thorpe, C. D.; Olsen, W. R.; Fischer, H.; Doust, V. L.; Joseph, R. R. (Univ. Michigan Med. Ctr., Ann Arbor). *Amer. J. Surg.* 125(1):46-50, 1973.

A prospective study of diagnostic emergency i.v. cholangiography was conducted in 55 selected patients (28 male, 27 female) with acute abdominal pain. When hepatic function was adequate, opacification of all or part of the biliary system occurred in 96% of the patients. The presence of pancreatitis rarely precluded a successful study. At least 85% of the cholangiograms were diagnostically helpful, and 38% significantly altered the admitting diagnosis. Final diagnoses were: biliary pancreatitis (11), alcoholic pancreatitis (17), idiopathic pancreatitis (7), acute cholecystitis (4), common bile duct stone (2), cholelithiasis (1), and miscellaneous (13, including peptic ulcer, Curtis-Fitzhugh syndrome, sickle cell crisis, and unknown causes).

3236 ENDOSCOPIC PANCREATO-CHOLANGIOGRAPHY. A PRELIMINARY REPORT OF TECHNIQUE AND DIAGNOSTIC SIGNIFICANCE.

(E.) Okuda, K.; Someya, N.; Goto, A.; Kunisaki, T.; Emura, T.; Yasumoto, M.; Shimokawa, Y. (Kurume Univ. Sch. Med., Japan). *Amer. J. Roentgenol. Radium Ther. Nucl. Med.* 117(2): 437-445, 1973.

Using an Olympus JF-B type fiberduodenoscope, retrograde pancreatography and/or choledochography has been performed on 47 subjects. Diagnoses in the 47 cases included chronic pancreatitis (8), pancreatolithiasis (4), carcinoma of pancreas (2), cholelithiasis (11), cholangitis (1), carcinoma of the bile duct (1), insufficiency of the sphincter of Oddi (2), hepatoma (1), metastatic liver carcinoma (1), and hyperthyroidism (1). The papilla of Vater was cannulated in 86% of the attempts, and in 83% the pancreatic ductogram was obtained. The common duct was visualized less frequently. There has been no accident, although in about ½ of the subjects, a transient rise in serum amylase occurred shortly after the procedure. Increased serum amylase activities could be minimized by using Trasylol. and be minimized by the preventive use of Trasylol. Although evaluation of the diagnostic significance of retrograde pancreatography is yet to be determined, it was helpful in the diagnosis of chronic pancreatitis and carcinoma of the pancreas, and may prove to be a reliable measure in patients with suspected pancreatic and biliary tract diseases.

3237 SCANNING OF THE HEPATIC BLOOD POOL IN THE DIFFERENTIAL DIAGNOSIS OF SPACE-OCCUPYING LESIONS OF THE LIVER. WITH EMPHASIS ON AMEBIC ABSCESS.

(E.) Gordon, F.; Cuaron, A.; Rodrigo Munoz, J.; Landa, L. (Gen. Hosp. Natl. Med. Ctr., Mexico City, Mexico). *Ann. Intern. Med.* 78(2):247-250, 1973.

To improve the diagnostic accuracy of liver scanning, 162 patients were studied with a combined scintigraphic method. These patients had amebic abscesses (59), primary carcinoma (18), liver metastases (37), cirrhosis of the liver (7), polycystic disease (19), hemangioma (1), and calcified hematoma (1). A group of 20 normal subjects served as controls. A liver scan with colloidal ^{113m}In was performed first, followed by a scan with ionic ^{113m}In to visualize the hepatic blood pool. In all cases the first scan showed one or more filling defects. The second scan showed an increase of radioactivity at the periphery of lesions in 96% of amebic abscesses and in all cysts; radioactivity inside the lesion increased in 70% of primary and metastatic tumors. In a hemangioma, the increase of radioactivity inside the lesion was greater than that peripherally. It is concluded that liver scintigraphy with colloids can be used routinely for the localization of intrahepatic lesions, and ionic ^{113m}In may be used optionally to obtain more information on the degree of vascularity inside the lesion, thus improving the differential diagnosis between tumors, cysts, and abscesses.

3238 ULTRASONIC DETERMINATION OF ASCITES.

(E.) Goldberg, B. B.; Clearfield, H. R.; Goodman, G. A.; Morales, J. O. (Episcopal Hosp., Philadelphia, Pa.). *Arch. Intern. Med.* 131(2):217-220, 1973.

Ultrasound has been used to determine the presence of ascites in 51 of 85 patients tested. By comparing the ultrasonic measurements with isotope dilution results, or with the actual volume of fluid found at surgery or autopsy, it has been shown that ultrasound can be used to provide an estimate of the amount of free intra-abdominal fluid. Ultrasonic determinations of ascites have been of value in determining response to both medical and surgical therapy. They also have proved useful as an initial rapid screening procedure in those patients suspected of having free i.p. fluid, such as in cases of abdominal trauma where hemoperitoneum is suspected. A fixed fluid pattern, as found in subdiaphragmatic abscesses or enlarged gallbladders, and fluid-filled bowel loops can be differentiated from ascites by this method. This method for detection of ascites is particularly useful when the volume of fluid is small or the patient is obese.

3239 OBSERVER ERROR IN REPORTING ON LIVER SCANS FOR SPACE-OCCUPYING LESIONS.

(E.) Ludbrook, J.; Slavotinek, A. H.; Ronai, P. M. (Dept. Surg., Univ. Adelaide, Australia). *Gastroenterology* 62(5):1013-1019, 1972.

Of 563 patients who underwent liver scanning, the livers of 99 became available for examination during surgery or at autopsy. These 99 ^{99m}Tc-sulfur colloid γ-camera-imaged liver scans were examined by 7 observers who with no additional knowledge decided whether a space-occupying lesion was present. Clinical information was at first withheld from, then given to, the observers. Of the 99, 42 were diagnosed from the scans as having space occupying lesions. The true diagnoses of these 42 were: metastatic carcinoma (36), hydatid cyst (2), intrahepatic abscess (2), hepatoma (1), and reticulosarcoma (1). Of the 99, 57 were diagnosed from their scans as having no space-occupying lesions. The true diagnoses of these 57 were: normal liver (29), cirrhosis (18), carcinoma of pancreas with bile duct obstruction (6), subphrenic abscess (2), carcinoma of gallbladder (1), and pyonephrosis (1). Four observers reread the scans after being informed of their high false-positive rates. On best performance, the average over-all error rate was 20% (36% false-negative, 8% false-positive). The 7 observers had closely similar over-all error rates, but widely differing distributions of false-negative and false-positive rates. Attempts to bias the observers toward reducing their false positive error rates were successful in the case of untrained observers but unsuccessful in the case of nuclear physicians. It is concluded that, because of the high rate of observer error in interpreting liver scans, they should be used to create an index of suspicion of abnormality rather than being regarded as diagnostic.

3240 A PHYSIOLOGICAL METHOD FOR ESTIMATION OF HEPATIC SECRETION OF BILIARY LIPIDS IN MAN.

(E.) Grundy, S. M.; Metzger, A. L. (Phoenix Indian Med. Ctr., Arizona). *Gastroenterology* 62(6):1200-1217, 1972.

A method has been developed for the measurement of the hourly outputs into the duodenum of biliary lipids, cholesterol, bile acids, and phospholipids in 30 patients (14 women, 16 men, aged 21-69 yr). Disorders in these patients were diagnosed as primary biliary cirrhosis (1), hyperglyceridemia (3, one of whom also had ischemic heart disease), hypercholesterolemia (3), obesity (2), normolipidemia with ischemic heart disease (1), alcoholic cirrhosis (1), cholelithiasis (7), postcholecystectomy syndrome (3), hypertension (1), alcohol excess (4), diabetes mellitus (2), biliary dyskinesia (1), and irritable bowel (1). The method employs duodenal intubation with 2- or 3- lumen tubes; liquid formula diets are infused at constant rates, and biliary lipid outputs are estimated by marker dilution techniques with either radioactive or nonradioactive markers. Biliary lipid output was estimated for 18-30 hr. During the first 4-6 hr of formula infusion outputs were high due to gallbladder bile, but thereafter a steady state in duodenal output was achieved. This state was assumed to correspond to the rate of hepatic secretion. Steady-state outputs of cholesterol ranged from 28 to 85 mg/hr for different patients, with small hourly variations in output. Average secretion rates of bile acids were much greater (234-1440 mg/hr), and larger fluctuations from hour to hour could probably be explained by variable rates of bile acids reabsorption from the distal small intestine. Hourly outputs of phospholipids ranged from 311 to 578 mg/hr and showed less variability than did bile acids.

3241 EXFOLIATIVE CYTOLOGY IN GASTRIC ULCER. ITS ROLE IN THE DIFFERENTIATION OF BENIGN AND MALIGNANT ULCERS.

(E.) Prolla, J. C.; Xavier, R. G.; Kirsner, J. B. (Porto Alegre Med. Sch., Brazil). *Gastroenterology* 63(1):33-37, 1972.

The role of exfoliative cytology in differential diagnosis was studied in 631 gastric ulcers (70 malignant and 561 benign). In the group of 70 malignant ulcers (61 Borrmann Type II and 9 superficial gastric carcinomas), cytology was positive in 51 cases. The positive cytological examination (saline washing) was particularly helpful in 20 of 33 patients with inconclusive or benign radiological examinations. Direct vision brushing cytology appeared helpful and, combined with endoscopic biopsy, resulted in diagnostic success in all of 50 patients with esophageal and gastric tumors of various types, including 5 ulcer-cancers. In these 50 cases, in which both cytology and biopsy examinations were performed, at least 1 procedure was positive and, in 35 cases, both procedures were positive.

3242 USE OF PERTECHNETATE CLEARANCE IN THE STUDY OF GASTRIC PHYSIOLOGY.

(E.) Bickel, J. G.; Witten, T. A.; Killian, M. K. (Univ. Colorado Med. Ctr., Denver). *Gastroenterology* 63(1):60-66, 1972.

The gastric clearance of pertechnetate (C_{Tc}) was compared with volume and acid output in 8 patients during basal, moderately stimulated (25 mg of betazole) and strongly stimulated (75 - 100 mg of betazole) states. Of 8 subjects (7 male, 1 female), 3 had duodenal ulcer and 4 had symptoms compatible with ulcer but with no x-ray evidence of ulcer. Of these 4, 3 had normal gastric analyses and 1 had a high stimulated acid output. One was a healthy volunteer. Sodium pertechnetate solution was constantly perfused i.v. by a finger pump so that subjects received about 2 mCi in a 3-hr study period. Phenol red was constantly infused into the stomach as a marker substance and gastric contents were removed by continuous hand aspiration; volume corrections were made based on phenol red recovery; acid outputs were determined by titration. Gastric clearances of pertechnetate were computed from measured serum and gastric juice radioactivity. The factor of proportionality relating C_{Tc} to secretory output changes in relation to the strength of stimulus employed. The same phenomenon was observed when the data of others relating aminopyrine clearance to acid secretion volume in dogs, and data relating iodine clearance to acid secretion in dogs, were subjected to similar computation. The results suggest that at a given level of stimulation, good proportionality exists between the clearances of pertechnetate, aminopyrine, and iodine and gastric secretory vigor. It is expected that a patient with a Zollinger-Ellison tumor, having an endogenous source of gastrin, would show a disproportionately low C_{Tc} in association with basal hypersecretion.

3243 ENDOSCOPIC PANCREATOCHOLANGIOGRAPHY IN THE EVALUATION OF PANCREATIC AND BILIARY DISEASE.

(E.) Ogoshi, K.; Niwa, M.; Hara, Y.; Nebel, O. T. (Niigata Cancer Ctr., Japan). *Gastroenterology* 64(2):210-216, 1973.

Recent advances in fiberoptic instrumentation permit direct observation in the duodenum and cannulation of the ampulla of Vater with pancreatocholangiography in almost all cases. Satisfactory cannulation was obtained in 228 (90%) of 252 consecutive patients with pancreatobiliary symptoms, revealing this to be a safe and effective technique that may add significant new information in the evaluation of these patients. Pancreatocholangiography revealed a normal pancreatic duct (93 cases), acute pancreatitis (4), chronic pancreatitis (15), pancreatic carcinoma (21), cholelithiasis (64), cancer of the common bile duct (8), gallbladder carcinoma (2), hepatoma (3), metastatic gastric carcinoma (1), intrahepatic bile duct carcinoma (1), common duct adenoma with obstruction with postcholecystectomy common duct (1), duodenal fistula with secondary cholangitis (1), and miscellaneous lesions (14).

3244 THE USE OF COMBINED ULTRASONIC AND ISOTOPE SCANNING IN THE DIAGNOSIS OF AMOEBIC LIVER DISEASE.

(E.) Matthews, A. W.; Gough, K. R.; Davies, E. R.; Ross, F. G. M.; Hinchliffe, A. (Roy. United Hosp., Bath, England). *Gut* 14(1):50-53, 1973.

Case reports are presented for 3 men, 27-54 yr old, in whom amebic liver abscesses were diagnosed by ultrasonic and isotope scanning. All 3 of the men had traveled to endemic areas although one had returned 23 yr previously. Two of the patients did not have jaundice, and serum bilirubin, alkaline phosphatase, and protein values were normal to slightly elevated in all. Amebic fluorescent antibody titers were 1:64 and 1:256 in the 2 patients in whom they were determined. Scintigrams showed one or more well-defined defects which were then identified as fluid-filled cavities by ultrasonic scans. "Anchovy sauce" fluid was aspirated but was sterile in 2 of the 3 patients. In one patient the abscess ruptured into the pleural cavity. All patients responded to chemotherapy with metronidazole, emetin, or a combination of emetin and chloroquine. In one patient secondary infection resulted in the formation of a biliary fistula which healed 1 yr after laparotomy.

3245 SIMPLIFIED AND SENSITIVE DETECTION OF SUBTYPES OF AUSTRALIA ANTIGEN (HB Ag) USING A SOLID-PHASE RADIOIMMUNE ASSAY.

(E.) Ginsberg, A. L.; Bancroft, W. H.; Conrad, M. E. (Walter Reed Army Inst. Res., Washington, D.C.). *J. Lab. Clin. Med.* 80(2):291-296, 1972.

Serum specimens containing Australia antigen (HB antigen) have been subtyped as either *ay* or *ad* using a solid-phase radioimmune assay. This system permitted the correct identification of 24 coded specimens previously subtyped by agar gel immunodiffusion. In a series of 52 sera from soldiers with HB antigen positive hepatitis, only 7% could be subtyped by agar gel immunodiffusion, whereas 33 were subtyped by radioimmune assay; 28 were *ad* and 5 were *ay*. Solid-phase radioimmune assay provides a means of subtyping many HB antigen positive specimens that cannot be subtyped by other methods, so this method is advocated for use in blood banks where all major subtypes of HB antigen must be detected.

3246 DIAGNOSIS OF EXTRAHEPATIC BILIARY OBSTRUCTION IN INFANTS BY IMMUNOCHEMICAL DETECTION OF LP-X AND MODIFIED ^{131}I-ROSE BENGAL EXCRETION TEST.

(E.) Poley, J. R.; Alaupovic, P.; McConathy, W. J.; Seidel, D.; Roy, C. C.; Weber, A. (Children's Mem. Hosp., Oklahoma City). *J. Lab. Clin. Med.* 81(3): 325-341, 1973.

To test for extrahepatic biliary obstruction in infants and children with persistent cholestatic liver disease, serum samples from 50 patients were examined for the presence of an abnormal low-density lipoprotein (LP-X). LP-X was identified by immunoelectrophoresis in sera from 16 infants aged 2-6 months in whom SGOT values were 74-880 IU; alkaline phosphatase, 200-3,059 IU; and bilirubin, 10.1/5.4-18.9/13.9 mg% (total/conjugated). LP-X was also found in 8 infants and children aged 7-46 months with extrahepatic biliary obstruction without hepatic decompensation in whom SGOT values were 70-385 IU; alkaline phosphatase, 146-2,560 IU; and bilirubin, 14.8/10.6-24.6/19.8 mg% (total/conjugated). However, LP-X was not found in sera from 9 patients aged 7-40 months with extrahepatic biliary obstruction and hepatic decompensation. LP-X was absent in infants with marked intrahepatic cholestasis. Results of a modified ^{131}I-Rose Bengal excretion test performed with cholestyramine (4 g/day p.o.) in 11 infants with severe cholestasis showed that infants with extrahepatic cholestasis excreted 7.8% and those with intrahepatic cholestasis 26.2% of the administered radioactive label in 96 hr. The combination of LP-X and modified ^{131}I-Rose Bengal excretion tests represents a new diagnostic tool for identification and differentiation of extrahepatic and intrahepatic cholestasis in infants.

3247 ABSORPTION OF FRUCTOSE AS MEASURED BY PORTAL CATHETERIZATION.

(E.) Dencker, H.; Lunderquist, A.; Meeuwisse, G.; Norryd, C.; Tranberg, K. G. (Dept. Surg., Univ. Lund, Sweden). *Scand. J. Gastroenterol.* 7(8):701-705, 1972.

The absorption of intraduodenally infused fructose was studied by simultaneous sampling of portal and arterial blood in 6 patients (4 men, 2 women; 54-71 yr old) without liver disease. All had carcinoma of the colon without demonstrable metastases. After an overnight fast, 12 g D-fructose in 200 ml water was administered in 10 min via a duodenal tube. A positive portal-arterial difference in fructose concentration occurred for 35-80 min after infusion. No significant differences between portal and arterial blood glucose concentrations were found during the first 40 min after infusion, but positive differences were often seen at 40-100 min. Fructose absorption proceeded at a rate similar to that previously found after glucose infusion, and was essentially complete in 1 hr. No significant conversion of fructose to glucose during transport through the intestinal mucosa was demonstrated.

3248 ABSORPTION OF MALTOSE AS MEASURED BY PORTAL CATHETERIZATION. *(E.)* Dencker, H.; Johannesson, E.; Meeuwisse, G.; Norryd, G.; Tranberg, K. G. (Dept. Surg., Univ. Lund, Sweden). *Scand. J. Gastroenterol.* 7(8):707-710, 1972.

The absorption of intraduodenally instilled maltose in 4 patients (3 men and 1 woman, aged 36-59 yr), as measured by portal catheterization, was compared with that of glucose. All patients had carcinoma of the colon with no demonstrable liver metastases. After an overnight fast, 12 g maltose monohydrate or 12 g D-glucose, dissolved in 200 ml water, was introduced via a duodenal tube. Maltose was digested and absorbed at the same rate as that observed after instillation of an equal amount of free glucose.

3249 ACTIVE CHRONIC HEPATITIS: USE OF BROMOSULPHTHALEIN Tm AND S [STORAGE] IN ESTIMATING DISEASE ACTIVITY. *(E.)* Goldstein, G.; Mistilis, S. P. (Roy. Prince Alfred Hosp., Camperdown, Australia). *Scand. J. Gastroenterol.* 7(8): 737-741, 1972.

A study was made of the value of estimating the hepatic transport maximum (Tm) and storage of sulfobromophthalein in assessment of disease activity in 14 patients (2 male, 12 female; aged 11-61 yr) with active chronic hepatitis. The mean duration of the disease was 7 yr and 12 patients were receiving azathioprine and prednisone alone or in combination during this study. Patients with active disease had a lower sulfobromophthalein storage and Tm than normal controls or patients with inactive disease. Patients with inactive disease had a normal Tm but a low sulfobromophthalein storage. Analysis of variance of liver function tests showed that Tm was the best single index of disease activity. Patients previously considered to have inactive liver disease may in fact have low grade activity which can only be demonstrated by measurement of the Tm.

3250 COMPARATIVE RESPONSE OF EXOCRINE PANCREATIC SECRETION FOLLOWING A TEST MEAL AND SECRETIN-PANCREOZYMIN STIMULATION. *(E.)* Lurie, B.; Brom, B.; Bank, S.; Novis, B.; Marks, I. N. (Groote Schuur Hosp., Cape Town, South Africa). *Scand. J. Gastroenterol.* 8(1):27-32, 1973.

The methods and results of a test meal in 16 controls with no history of abdominal or pancreatic disease or excessive alcohol intake and 34 pancreatitis patients are presented. In 14 patients pancreatitis was found at laparotomy; 14 others had radiological evidence, and 6 had either grossly abnormal secretin-pancreozymin tests, or serum amylase above 100 U/ml during attack, or a history of pancreatitis plus abnormal pancreatic function tests and serum amylase above 300 U/ml. This study confirms the value of the test meal in the diagnosis of pancreatic disease. A comparison between the test meal and the secretin-pancreozymin test in 6 control subjects and 20 pancreatitis patients shows a good correlation between the 2. The mean amylase concentrations in the 2 tests show a better correlation than those of trypsin. The test meal may be shortened to one 30-min collection and is simple, safe, and convenient.

3251 RADIONUCLIDE IMAGING STUDIES OF GASTROINTESTINAL DISORDERS. *(E.)* Duszynski, D. O. (Children's Hosp., Buffalo, N.Y.). *Semin. Nucl. Med.* 2(4):383-386, 1972.

3252 CLINICAL AND BIOCHEMICAL EVIDENCE OF INCREASED GALLSTONE FORMATION AFTER COMPLETE VAGOTOMY. *(E.)* Tompkins, R. K.; Kraft, A. R.; Zimmerman, E.; Lichtenstein, J. E.; Zollinger, R. M. (Ohio State Univ. Coll. Med., Columbus). *Surgery* 71(2):196-200, 1972.

3253 A NEW PANCREATIC FUNCTION TEST. *(E.)* Carboni, M.; Patrassi, N.; Simi, M. (2nd Surg. Clin., Univ. Rome, Italy). *Surg. Italy* 1(2): 159-167, 1971.

3254 RADIOLOGICAL EVALUATION OF THE GASTRIC FUNDUS. *(Ger.)* Deimer, E.; Canigiani, G.; Wolf, G. (Inst. Radiol. Diagn., Univ. Vienna, Austria). *Wien. Med. Wochenschr.* 122(21):300-305, 1972.

3255 THE SIGNIFICANCE OF VARIOUS MODIFICATIONS OF THE ORAL GALACTOSE TOLERANCE TEST AS A LIVER FUNCTION TEST. *(Ger.)* Maaz, E.; Hoffrichter, E. (Regional Hosp., Dresden-Friedrichstadt, Germany). *Z. Gesamte Inn. Med.* 27(13):554-559, 1972.

3256 THE DIAGNOSTIC VALUE OF CONJUGATED BILE ACIDS IN SERUM. *(Ger.)* Schentke, U.; Jaross, W.; Trubsbach, A.; Renger, F. (Carl Gustav Carus Med. Acad., Dresden, Germany). *Z. Gesamte Inn. Med.* 27(15):663-666, 1972.

3257 USE OF α_1-FETOPROTEIN IN THE DIAGNOSIS OF PRIMARY LIVER CELL CARCINOMA. *(Ger.)* Muller, G. M.; Geserick, G. (German Central Inst. Occupational Med., Berlin). *Z. Gesamte Inn. Med.* 27(24):1084-1087, 1972.

3258 TWO SIMPLE METHODS FOR DETERMINING LDH ISOENZYMES IN LIVER DISEASE. *(Ger.)* Reissmann, K.; Trenckmann, H. (Med. Clin., Karl Marx Univ., Leipzig, Germany). *Z. Gesamte Inn. Med.* 28(3):65-68, 1973.

3259 METHODOLOGICAL INFORMATION FOR DETERMINING ENZYME ACTIVITIES IN PUNCH LIVER BIOPSIES. *(Ger.)* Grimm, U.; Knapp, A. (Ernst Moritz Arndt Univ., Greifswald, Germany). *Z. Med. Labortech.* 13(4):246-249, 1972.

3260 HEPATIC ARTERIOGRAPHY IN CIRRHOSIS. *(Sp.)* Arcos Perez, M.; Silva, E. (Fac. Med., Montevideo, Uruguay). *Acta Gastroenterol. Latinoam.* 4(3):101-109, 1972.

3261 THE IRRELEVANCIES OF DISACCHARIDASE ASSAYS. *(E.)* McMichael, H. B. (Middlesex Hosp., London, England). *Acta Hepatogastroenterol.* 19:281-290, 1972.

3262 VALIDITY OF THE INTRAVENOUS GALACTOSE TOLERANCE TEST FOR DIAGNOSING HEPATIC CIRRHOSIS. *(Ger.)* Bohmer, R.; Rommel, K. (Ctr. Intern. Med. Pediatr., Univ. Ulm, Germany). *Acta Hepatogastroenterol.* 19(5):344-356, 1972.

3263 SULFOBROMOPHTHALEIN (BSP) EXCRETION: MATHEMATICAL STUDY OF THE BEHAVIOR OF THIS COMPOUND WHEN ADMINISTERED INTRAVENOUSLY IN A SINGLE DOSE. *(Ger.)* Valtuena, J. P.; Calvo de Olmo, T.; de Castro del Pozo, S. (Med. Clin., Univ. Valladolid, Spain). *Acta Hepatogastroenterol.* 19(5):362-373, 1972.

3264 VALUE OF AZYGOGRAPHY IN PATIENTS WITH CARCINOMA OF THE ESOPHAGUS. *(E.)* Yamasaki, M.; Yamamoto, M.; Sato, M.; Sakai, K. (Niigata Univ. Sch. Med., Japan). *Acta Med. Biol.* 20(1):11-18, 1972.

3265 ALPHA-FETOPROTEIN: DIAGNOSTIC AND PROGNOSTIC USE IN PATIENTS WITH HEPATOMAS. *(E.)* Purtilo, D. T.; Kersey, J. H.; Hallgren, H. M.; Fox, K. R.; Yunis, E. J. (Univ. Minnesota Hosp., Minneapolis). *Am. J. Clin. Pathol.* 59(3): 295-299, 1973.

3266 INTRAVENOUS CHOLANGIOGRAPHY: AN EXPERIMENTAL EVALUATION OF SEVERAL CURRENTLY PROPOSED METHODS. *(E.)* Moss, A. A.; Nelson, J.; Amberg, J. (Univ. California, Sch. Med., San Francisco). *Am. J. Roentgenol. Radium Ther. Nucl. Med.* 117(2):406-411, 1973.

3267 DETECTION OF MALIGNANT DISEASE BY PERORAL RETROGRADE PANCREATICOBILIARY DUCTOGRAPHY. *(E.)* Robbins, A. H.; Paul, Jr., R. E.; Norton, R. A.; Schimmel, E. M.; Tomas, J. G.; Sugarman, H. J. (Tufts Univ. Sch. Med., Boston, Mass.). *Am. J. Roentgenol. Radium Ther. Nucl. Med.* 117(2): 432-436, 1973.

3268 NEW TECHNIC TO IDENTIFY VASCULAR LESIONS IN THE GASTROINTESTINAL TRACT. *(E.)* Mackman, S.; Wu, J. P. (Univ. Wisconsin Med. Ctr., Madison). *Am. J. Surg.* 125(3):353-355, 1973.

3269 HEPATITIS-ASSOCIATED ANTIGEN SCREENING BY AUTOMATED COMPLEMENT FIXATION: COMPARISON WITH MANUAL METHODS. *(E.)* Kwak, K. S.; Gitnick, G. L.; Sturgeon, P. (Gwynne Hazen Cherry Mem. Lab., Univ. California, Los Angeles). *Am. J. Clin. Pathol.* 59(1):41-48, 1973.

3270 RADIOLOGIC DIAGNOSIS OF EXTRAHEPATIC BILIARY OBSTRUCTION IN JAUNDICED PATIENTS *(E.)* Eaton, Jr., S. B.; Ferrucci, Jr., J. T.; Handmaker, H.; James, Jr., A. E. (Massachusetts Gen. Hosp., Boston). *Am. J. Gastroenterol.* 58(4): 477-490, 1972.

3271 RADIOLOGICAL AND ENDOSCOPIC CORRELATION OF DUODENAL ULCERS. *(E.)* Font, R. G.; McDowell, W.; Sparks, R. D.; Varela, P. (Tulane Univ. Sch. Med., New Orleans, La.). *Am. J. Gastroenterol.* 58(5):519-524, 1972.

3272 PERITONEOSCOPY: ANALYSIS OF 150 CASES. *(E.)* Rivera, R. A.; Boyce, Jr., H. W. (George Washington Univ., Sch. Med., Washington, D.C.). *J. Gastroenterol.* 58(6):594-603, 1972.

3273 PERITONEOGRAPHY: NORMAL AND PATHOLOGIC ANATOMY. *(E.)* Meyers, M. A. (New York Hosp. Cornell Univ. Med. Coll., N.Y.). *Am. J. Roentgenol. Radium Ther. Nucl. Med.* 117(2):353-365, 1973.

3274 ROUTINE TOMOGRAPHY IN GALLBLADDER NONVISUALIZATION: A METHOD FOR EXTENDED POSITIVE DIAGNOSIS. *(E.)* Margulies, M.; Wohl, G. T. (Lankenau Hosp., Philadelphia, Pa.). *Am. J. Roentgenol. Radium Ther. Nucl. Med.* 117(2): 400-405, 1973.

3275 SKIN TEST FOR AMEBIASIS: AN APPRAISAL. *(E.)* Savanat, T.; Bunnag, D.; Chongsuphajaisiddhi, T.; Viriyanond, P. (Fac. Trop. Med., Bangkok, Thailand). *Am. J. Trop Med. Hyg.* 22(2):168-172, 1973.

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3277 LARGE-BOWEL PERFORATIONS IN PATIENTS UNDERGOING SIGMOIDOSCOPY AND BARIUM

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GASTROINTESTINAL DISEASES

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See also 3264, 3296, 3312.

STOMACH

3356 THE RESPONSE TO PREDNISOLONE IN ATROPHIC GASTRITIS: A POSSIBLE EFFECT ON NON-INTRINSIC FACTOR-MEDIATED VITAMIN B_{12} ABSORPTION. *(E.)* Strickland, R. G.; Fisher, J. M.; Lewin, K.; Taylor, K. B. (Stanford Univ. Sch. Med., Calif.). *Gut* 14(1):13-19, 1973.

The administration of prednisolone (20 mg/day, p.o.) did not affect absorption of vitamin B_{12} and gastric secretion of intrinsic factor in 9 male subjects with normal gastric mucosa, or in 5 males with chronic superficial gastritis without atrophy. No gastric morphological changes were observed in either group. A group of 12 (6 female) patients with Addisonian pernicious anemia were also studied; 7 of them were given predinisolone for 2-10 months. Of these 7, 4 showed improvement in absorption of vitamin B_{12}. No consistent changes in gastric mucosal morphology were noted. The remaining 5 patients were studied intensively during 1 month of prednisolone administration. In 3, absorption of vitamin B_{12} was restored to within the normal range between 8-13 days after institution of the drug. The improvement was not paralleled by enhancement of intrinsic factor secretion or other vitamin B_{12} binders. Suppression of intrinsic factor antibodies in serum and gastric juice did not occur consistently in those patients showing a functional response.

3357 SERUM AND TISSUE GASTRIN CONCENTRATIONS IN PATIENTS WITH CARCINOMA OF THE STOMACH. *(E.)* McGuigan, J. E.; Trudeau, W. L. (Univ. Florida Coll. Med., Gainesville). *Gastroenterology* 64(1): 22-25, 1973.

Fasting serum gastrin concentrations and gastric acid secretory rates were examined in 22 patients (18 male, 4 female; mean age 62.4 yr) with carcinoma of the stomach. The mean fasting serum gastrin concentration for the patients with carcinoma of the stomach (344 ± 52 pg/ml) substantially and significantly exceeded that for a control population of 55 patients without recognized gastrointestinal disease. The mean fasting serum gastrin concentration for the 11 patients with carcinoma in the antrum of the stomach was 80 ± 18 pg/ml, for the 6 patients with carcinoma in the region of the junction of the antrum and body 257 ± 32 pg/ml, and for the 5 with carcinoma in the body of the stomach 1,028 ± 389 pg/ml. Achlorhydria was not noted among any of the 11 patients with carcinoma of the gastric antrum, whereas, among the 11 patients with carcinoma in the midportion or body of the stomach, 7 were achlorhydric, even after maximum stimulation. Several patients, all of whom were achlorhydric, exhibited fasting serum gastrin levels in the range characteristic of patients with Zollinger Ellison syndrome. Negligible amounts of gastrin (less than 10 pg/mg of tissue) were found in extracts of tumor tissue from the patients with gastric carcinoma. It appears that in some gastric carcinoma patients, particularly those with achlorhydria, high serum gastrin concentrations may result from the absence of acid in the antrum of the stomach. Thus, in these patients there is no normal way to inhibit gastrin release.

3358 A FINE STRUCTURAL CHARACTERIZATION OF THE PROLIFERATED ENDOCRINE CELLS IN ATROPHIC GASTRIC MUCOSA. *(E.)* Rubin, W. (Med. Coll. Pennsylvania, Philadelphia). *Am. J. Pathol.* 70(1):109-118, 1973.

Most of the proliferated endocrine cells in nonintestinalized epitheiium in the body of stomachs in 11 adult patients with pernicious anemia have the fine structure of enterochromaffin-like cells, the principal endocrine cell in the body of normal stomachs. There is an absence of gastrin (G) cells, the principal endocrine cell in the normal pylorus. Since gastrin has been identified in many of these proliferated cells by immunofluorescence, these findings cast doubt on the hypothesis that gastrin synthesis in the stomach is only associated with G cells. Perhaps these cells produce other physiologically active peptides and amines.

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3365 XANTHOFIBROMA OF THE STOMACH: NEOPLASM OR PSEUODTUMOR? *(E.)* Suprun, H.; Stamler, B.; Manelis, G. (Nahariya Govt. Hosp., Israel). *Am. J. Gastroenterol.* 59(2):152-161, 1973.

3366 SMALL INTESTINAL MUCOSAL ABNORMALITIES AND DISACCHARIDASE ACTIVITY IN PERNICIOUS ANAEMIA. *(E.)* Pena, A. S.; Callender, S. T.; Truelove, S. C.; Whitehead, R. (Radcliffe Infirm., Oxford, England). *Br. J. Haematol.* 23(3):313-315; 321, 1972.

3367 GASTRIC PHYTOBEZOAR AND HYPOGLYCEMIA: MEDICAL MANAGEMENT. *(E.)* Meyer, G. W.; Clark, R. D.; Brotman, M. (Presbyterian Hosp., Pacific Med. Ctr., San Francisco, Calif.). *Calif. Med.* 118(2):66-67, 1973.

3368 DIFFERENTIAL TOPOGRAPHY OF ACUTE EROSIVE GASTRITIS DUE TO TRAUMA OR SEPSIS, ETHANOL AND ASPIRIN. *(E.)* Sugawa, C.; Lucas, C. E.; Rosenberg, B. F.; Riddle, J. M.; Walt, A. J. (Wayne State Univ. Sch. Med., Detroit, Mich.). *Gastrointest. Endosc.* 19(3):127-130, 1973.

3369 SLOWLY GROWING GASTRIC CARCINOMA. *(E.)* Blackwood, W. D. (VA Hosp., Minneapolis, Minn.). *Gastrointest. Endosc.* 19(3):137-139, 1973.

3370 GASTRIC PSEUDOTUMOR DUE TO LESSER PERITONEAL SAC ABSCESS. *(E.)* Newman, A.; Newman, H. (Maricopa County Gen. Hosp., Phoenix, Ariz.). *Int. Surg.* 58(3):195-197, 1973.

3371 CARCINOMA OF THE STOMACH. *(E.)* Stephens, Jr., E. F. (no affil.). *J. Abdominal Surg.* 14(11):197-199, 1972.

3372 PRIMARY CARCINOMA IN THE OPERATED STOMACH. (CLINICAL CONTRIBUTION). *(It.)* Nigro, R.; Schonauer, M. (Inst. Surg. Symptomatol., Univ. Naples, Italy). *Rass. Int. Clin. Ter.* 52(3):458-469, 1972.

3373 "CASCADE" STOMACH: CONSIDERATION OF 11 CASES. *(Sp.)* Rodriguez Cuartero, A.; Urbano Jimenez, F.; Montero Garcia, M. (Dept. Intern. Med., Univ. Granada, Spain). *Rev. Esp. Enferm. Apar. Dig.* 38(1):67-76, 1972.

3374 GASTROCAMERA SCREENING IN PERNICIOUS ANAEMIA WITH SPECIAL REFERENCE TO THE OCCURRENCE OF GASTRIC POLYPS AND CANCER. *(E.)* Elsborg, L.; Andersen, D.; Bastrup-Madsen, P. (Aarhus Amtssygehus, Denmark). *Scand. J. Gastroenterol.* 8(1):5-8, 1973.

3375 POSTGASTRECTOMY PHYTOBEZOAR. *(E.)* Rowe, Jr., J. S.; Whitaker, Jr., W. G. (Piedmont Hosp., Atlanta, Ga.). *South. Med. J.* 65(12):1452; 1500, 1972.

3376 LEIOMYOMAS OF THE UPPER GASTROINTESTINAL TRACT. *(E.)* Kavlie, H.; White, T. T. (Univ. Washington Sch. Med., Seattle). *Surgery* 71(6):842-848, 1972.

3377 GASTRITIS AND DUODENITIS IN VARIOUS FORMS OF LIVER DISEASE. *(Ger.)* Koelsch, K. A.; Herms, G.; Kramer, G. (Regional Hosp., Magdeburg-Altstadt, Germany). *Z. Gesamte Inn. Med.* 28(3):57-62, 1973.

3378 HISTOCHEMICAL FINDINGS IN THE GASTRIC MUCOSA IN GASTRITIS. *(Ger.)* Petzold, H.; Achenbach, H.; Rogos, R. (Med. Clin., Karl Marx Univ., Leipzig, Germany). *Z. Gesamte Inn. Med.* 28(3):62-65, 1973.

See also 2992, 3241, 3254, 3295, 3296, 3306, 3316, 3400, 3781, 3835.

Peptic Ulcers

3379 EFFECT OF INTESTINAL HORMONES ON PENTAGASTRIN- AND HISTAMINE-EVOKED GASTRIC ACID SECRETION AND DUODENAL ULCERATIONS IN CATS.

(E.) Konturek, S. J.; Radecki, T.; Thor, P.; Kwiecien, N. (Inst. Physiol., Krakow, Poland). *Am. J. Dig. Dis.* 18(2):135-141, 1973.

In 10 conscious cats with gastric fistulae and the diversion of bile and pancreatic juice to the jejunum, secretin (1 U/kg/hr), cholecystokinin (4 U/kg/hr), and duodenal acidification (1 mEq HCl/hr) caused a marked inhibition of half-maximal gastric acid response to pentagastrin (8 μg/kg/hr) but did not alter the response to histamine (160 μg/kg/hr). With histamine stimulation, cholecystokinin produced a significant increase in acid output, which reached a peak of 130% of the control level. Pentagastrin and histamine administered singly produced peptic ulcers in all animals. With secretin added to pentagastrin and histamine, ulcers occurred in 1 of 12 and 2 of 10 cats, resp. Intrajejunal acid instillation decreased ulcer formation to 3 of 10 cats. Cholecystokinin added to pentagastrin induced ulcers in 4 of 12 cats in which the inflow of bile and pancreatic juice into the duodenum was undisturbed. The antiulcer action of the intestinal hormones can be attributed to their inhibitory effect on gastric acid secretion and to stimulation of pancreatic juice and bile secretion resulting in the increased neutralization of gastric acid in the duodenum.

3380 POSTTRAUMATIC GASTRIC BLEEDING. PROSPECTIVE GASTRIC SECRETION COMPOSITION.

(E.) Stremple, J. F.; Molot, M. D.; McNamara, J. J.; Mori, H.; Glass, G. B. J. (VA Hosp., Pittsburgh, Pa.). *Arch. Surg.* 105(2):177-185, 1972.

Of 50 combat casualties (all male, 18-25 yr old) studied prospectively 9 developed severe gastric ulcers. On the day of injury, gastric acid outputs were very low (30 mEq/24 hr) in all patients, and increased thereafter. Patients with bleeding had a mean gastric juice volume of 328 ml for the 1st 24 hr, and 151 ml on the 2nd-5th day. After the 1st 24 hr, this volume was always less in those who did not develop ulcers regardless of the severity of their wounds. Urinary steroid excretion was always within the normal range. Total gastric juice sialic acid output was identical, regardless of whether bleeding occurred, but was higher for those who developed gastric ulcers (225 mg) than for other patients (210 mg). The actual total "leak" plasma protein output was significantly greater in those who developed gastric ulcers (8 gm for 6 days), than in those who did not have clinically significant bleeding (5 gm for 6 days). Initial decreased acid output, accompanied by plasma protein "leakage" into the gastric lumen, is consistent with back diffusion of H+ ions soon after trauma. This investigation indicates that immediately after severe trauma all patients suffer varying degrees of damage to the gastrointestinal mucosal barrier.

3381 GASTRIC BLOOD FLOW IN ENDOTOXIN-INDUCED STRESS ULCER.

(E.) Richardson, R. S.; Norton, L. W.; Sales, J. E. L.; Eiseman, B. (Denver Gen. Hosp., Colo). *Arch. Surg.* 166(2):191-195, 1973.

The effect of endotoxin shock on the distribution of gastric blood flow was measured with radioactive microspheres in a swine stress ulcer model. Ten piglets were shocked with *Escherichia coli* endotoxin (3 mg/kg in 10 ml saline i.v.) and compared with 6 controls. Blood flow was calculated before and after shock by assaying 2-cm square secretions of stomach. Distribution of gastric blood flow was analyzed graphically and ischemic regions were compared to ulcerated areas. Blood flow to the stomach decreased from 47.8 to 35.6%. Flow to the fundus and antrum increased (28.5-34.5% and 23.7-29.8%, resp.). Endotoxin caused a redistribution of gastric blood flow which did not parallel cardiac output change. Blood pressure decreased immediately and remained below 50 mm Hg systolic except for a brief rise 30 min later. Arterial pH ranged from 7.31-7.50; the pO_2 was between 200-350 mm Hg and the pCO_2 between 17-32 mm. Ischemia was maximum in the corpus where flow/g decreased 62.2%, and stress ulcers developed only in this region in all shocked animals. There were no ulcers in controls where gastric blood flow paralleled cardiac output. Endotoxin caused a selective regional gastric ischemia unlike the diffuse, patchy flow seen after hemorrhage.

3382 EFFECT OF BILE SALTS ON IONIC PERMEABILITY OF CANINE GASTRIC MUCOSA DURING EXPERIMENTAL SHOCK.

(E.) DenBesten, L.; Hamza, K. N. (Univ. Iowa, Coll. Med., Iowa City). *Gastroenterology* 62(3):417-424, 1972.

The individual and combined effects of hemorrhagic shock and intragastric bile salts on ionic movement and mucosal injury have been studied in 24 dogs. Mean net fluxes per 30 min of H+, Na+, Cl, and K+ after the instillation of HCl alone (160 and 100 mEq/liter) into the distally occluded stomach were not different in normotensive and shocked animals, and none developed mucosal lesions. Fluxes of these ions, although increased 3-6-fold by the presence of bile salts (10 mM taurocholic acid), were not significantly different in normotensive and shocked animals. However, all animals who had bile salts and acid instilled into the stomach during hemorrhagic shock had large gastric erosions at autopsy. It was concluded that ionic movement is not influenced by hemorrhagic shock, and that the production of ulcers in this model is dependent on shock, which causes decreased blood flow, and increased H+ back diffusion from disruption of the gastric mucosal barrier.

3383 GASTRIC OPERATIONS AND GLUCOSE HOMEOSTASIS. *(E.)* Breuer, R. I.; Moses, III, H.; Hagen, T. C.; Zuckerman, L. (Evanston Hosp., Ill.). *Gastroenterology* 62(6):1109-1119, 1972.

Glucose challenge i.v. elicited similar glucose disappearance rates and integrated insulin responses in partial gastrectomy subjects, age and weight matched pyloroplasty subjects, and similarly matched controls, suggesting that pancreatic islet cell responsiveness was unaltered by either operation. All 7 gastrectomy subjects had antrectomy for duodenal ulcer; 4 had gastroduodenostomy, 3 gastrojejunostomy; 2 had truncal vagotomy; and 5 had more distal vagotomy. Pyloroplasty subjects had operations for duodenal ulcer including vagotomy, except for 1 man who required relief from gastric outlet obstruction due to nonspecific mucosal inflammation and did not have vagotomy. After glucose, (p.o. or intrajejunal), gastrectomy subjects exhibited higher integrated glucose responses than controls, while their corresponding integrated insulin responses were only minimally elevated. Insulin responses relative to the prevailing glucose concentrations (insulinogenic indices), measured soon after alimentary glucose administration, were significantly lower than control ratios. In pyloroplasty subjects p.o. glucose also elicited higher integrated glucose responses than in controls, but their integrated insulin responses were correspondingly elevated, and insulinogenic indices were similar at all points to control values. Intrajejunal glucose administration resulted in normal glucose tolerance curves in controls and did not change the abnormal tolerance typical of gastrectomy subjects after p.o. glucose. Therefore, rapid gastric emptying cannot be the major mechanism for these patients' early postprandial hyperglycemia. Abnormal alimentary glucose tolerance after partial gastrectomy more likely represents an effect of antrectomy on intestinal signals modulating glucose disposition and islet cell hormone release.

3384 SERIAL STUDIES OF GASTRIC SECRETION IN PATIENTS AFTER HIGHLY SELECTIVE (PARIETAL CELL) VAGOTOMY WITHOUT A DRAINAGE PROCEDURE FOR DUODENAL ULCER. I. EFFECT OF HIGHLY SELECTIVE VAGOTOMY ON BASAL AND PENTAGASTRIN-STIMULATED MAXIMAL ACID OUTPUT. *(E.)* Johnston, D.; Wilkinson, A. R.; Humphrey, C. S.; Smith, R. B.; Goligher, J. C.; Kragelund, E.; Amdrup, E. (General Infirm., Leeds, Eng.). *Gastroenterology* 64(1):1-11, 1973.

Serial tests of basal output and maximal acid output were performed in 54 patients with chronic duodenal ulcers before surgery and 1 week, 2-3 months, 6-12 months, and 12-24 months after highly selective vagotomy without a drainage procedure. Patients ranged in age from 16-70 yr and 42 were male. Dose-response studies showed that the dose of pentagastrin used was sufficient to elicit maximal acid output in patients after surgery. Dosages used 1 week after surgery were 6 and 10 μg/kg i.m.. Dosages used 1 yr after surgery were 6, 10, and 15 μg/kg s.c. Basal acid output was reduced by a mean of 92% at 1 week, 86% at 2-3 months, 87% at 6-12 months, and 80% beyond 1 yr. Basal acid output increased significantly between 3 months and 12-24 months after surgery. Maximal acid output was reduced by a mean of 51% at 1 week, 68% at 2-3 months, 55% at 6-12 months, and 55% at 12-24 months. The decrease in maximal acid output between 3 and 9 months, were both statistically significant. Thereafter, maximal acid output did not change significantly. Thus, highly selective vagotomy without drainage reduces between 1 week and 3 months after surgery, and the subsequent increase between 3 and 9 months, were both statistically significant. Thereafter, maximal acid output did not change significantly. Thus, hithly selective vagotomy without drainage reduces maximal acid output permanently by about 55%. The reductions in gastric secretion produced by this procedure are similar to those produced by truncal or bilateral selective vagotomy.

3385 SERIAL STUDIES OF GASTRIC SECRETION IN PATIENTS AFTER HIGHLY SELECTIVE (PARIETAL CELL) VAGOTOMY WITHOUT A DRAINAGE PROCEDURE FOR DUODENAL ULCER. II. THE INSULIN TEST AFTER HIGHLY SELECTIVE VAGOTOMY. *(E.)* Johnston, D.; Wilkinson, A. R.; Humphrey, C. S.; Smith, R. B.; Goligher, J. C.; Kragelund, E.; Amdrup, E. (General Infirm., Leeds, England). *Gastroenterology* 64(1):12-21, 1973.

Of 100 insulin tests performed 1 week after highly selective vagotomy, 97 were negative by Hollander's criteria; 3 were late-positive. In the course of the 1st year after surgery, acid outputs in response to insulin increased significantly. More than 1 year after surgery, 27 of 53 insulin tests were positive (51%), 19% being early-positive in the 1st hr after insulin and 32% late-positive, but the mean peak acid output in response to insulin was then only 3.9 mEq/hr, compared with 33 mEq/hr in 60 insulin tests performed before operation. This increase in positive response is explained as vagal reinnervation by the parietal cell mass and is not likely to be extensive. It is suggested that highly selective vagotomy denervates the parietal cell mass effectively, at least for a time. This method is not claimed to be superior to truncal or selective vagotomy.

3386 GASTRIC ACID SECRETION RATE AND BUFFER CONTENT OF THE STOMACH AFTER EATING. RESULTS IN NORMAL SUBJECTS AND IN PATIENTS WITH DUODENAL ULCER. *(E.)* Fordtran, J. S.; Walsh, J. H. (Univ. Texas Southwestern Med. Sch., Dallas). *J. Clin. Invest.* 52(3):645-657, 1973.

New methods are described by which the buffer content and the rate and pattern of net gastric acid secretion in human subjects fed normal meals can be measured using sodium bicarbonate infusion to control intragastric pH. *In vitro* experiments revealed that gastric acid secretion can theoretically be determined from the amount of sodium bicarbonate needed to maintain intragastric pH at 5.5, 5.0, or 3.0. With these techniques, it was shown that the rate of acid secretion in response to a steak meal in 7 duodenal ulcer patients (aged 20-58 yr; mean 38 yr) was twice the rate achieved in 6 control subjects and that the amount of acid secreted after eating exceeded the peak histamine response in ulcer patients but not in controls. Meal-stimulated acid secretion, expressed as a function of the peak histamine response, was roughly correlated with the serum gastrin concentration, but it was concluded that other factors must also contribute to the higher than normal secretory responses to the meal found in duodenal ulcer patients. Measurement of buffer content of the stomach revealed that the duodenal ulcer patients emptied the meal buffer at a much more rapid rate than the normal subjects. By 2 hr after eating, the ulcer subjects had less than half as much buffer in their stomachs as the controls. The combination of acid hypersecretion and rapid buffer emptying leads to abnormally high gastric acidity after a meal in duodenal ulcer patients. These results suggest that, in addition to a large parietal cell mass, parietal cell responsiveness to a meal and the rate of buffer emptying may be important in the pathogenesis of duodenal ulcer.

3387 PYLORIC-SPHINCTER DYSFUNCTION IN PATIENTS WITH GASTRIC ULCER. *(E.)* Fisher, R. S.; Cohen, S. (Univ. Pennsylvania Hosp., Philadelphia). *N. Engl. J. Med.* 288(6):273-276, 1973.

To determine whether changes in pyloric sphincter pressure are involved in the increased duodenogastric reflux in patients with gastric ulcer, pyloric sphincter pressure was measured in 10 patients (7 men, 3 women; 46-76 yr old), both while their ulcer was active and after healing. Ulcer distribution was: high lesser curvature (1), mid lesser curvature (4), prepyloric (3), and pyloric channel (2). Basal pressures in the patients with gastric ulcers did not differ from those in normal persons. Although pyloric pressure increased in normal subjects during both endogenous release or exogenous administration of secretin and cholecystokinin (1.0 U/kg/hr and 2.0 U/kg/hr, resp., i.v.), patients with gastric ulcer showed no response. In normal subjects, during duodenal acidification, duodenogastric reflux significantly diminished as pyloric pressure increased, but not in patients with gastric ulcer. After healing of the ulcer, the pyloric sphincter still showed no response to hormone stimulation. These studies suggest that in patients with gastric ulcer, pyloric sphincter dysfunction is responsible for increased duodenogastric reflux.

3388 A COMPARISON OF GASTRIC ACID SECRETIONS AFTER HIGHLY SELECTIVE VAGOTOMY WITHOUT DRAINAGE AND SELECTIVE VAGOTOMY WITH A PYLOROPLASTY. *(E.)* Kronborg, O.; Madsen, P. (Bispebjerg Hosp., Copenhagen, Denmark). *Scand. J. Gastroenterol.* 7(7):615-621, 1972.

Gastric acid secretion was measured in a controlled double-blind trial. Patients with associated gastrointestinal diseases or known mental diseases were excluded. The study included 30 duodenal ulcer patients (23 men and 7 women, aged 23-59 yr) who had undergone highly selective vagotomy without drainage and 30 others (18 men and 12 women, aged 22-60 yr) who had undergone a bilateral selective vagotomy with a Heineke-Mukulicz pyloroplasty. No differences in unstimulated or histamine-stimulated secretion between 2 paired groups were found. The insulin-stimulated secretion was higher after both operations. One recurrent and one persistent duodenal ulcer developed after highly selective vagotomy.

3389 SOME PROPERTIES OF MUCUS IN PATIENTS WITH GASTRIC ULCER. EFFECT OF TREATMENT WITH CARBENOXOLONE SODIUM. *(E.)* Domschke, W.; Domschke, S.; Classen, M.; Demling, L. (Dept. Med., Univ. Erlangen-Nurnberg, Erlangen, Germany). *Scand. J. Gastroenterol.* 7(7):647-651, 1972.

In 22 gastric ulcer patients the free, bound, and total N-acetylneuramine acid fractions of gastric juice were shown to be significantly lower than in controls. During 4 weeks of treatment with carbenoxolone sodium (300 mg/day during 1st week followed by 150 mg/day thereafter), N-acetylneuraminic acid contents increased above normal values. Controls, 20.7 μmol/hr; gastric ulcer patients, 15.2 μmol/hr; gastric ulcer with carbenoxolone, 23.8 μmol/hr. As sialic acids are known to be essential constituents of gastric glycoproteins which serve as a protective coat, it is suggested that the stimulative effect of carbenoxolone on N-acetylneuraminic acid production may contribute to the increased rate of healing of peptic ulcer in patients treated with the drug. No statistically relevant evidence was obtained here of carbenoxolone-induced changes in Alcian blue binding capacity, acid production, peptic activity, or protein content of gastric juice.

3390 INTRA-ABDOMINAL HERNIATION OF THE BOWEL: A LATE COMPLICATION OF GASTRIC RESECTION. *(E.)* Sorensen, T. (Central Hosp., Herning, Denmark). *Acta Chir. Scand.* 139(1):108-109, 1973.

3391 TETANY AND OSTEOMALACIA FOLLOWING GASTRECTOMY AND VAGOTOMY IN A CIRRHOTIC PATIENT. *(Fr.)* van der Hoeden, R.; Verbanck, M.; Brauman, J.; Kiekens, R.; Fox, A. (Gastroenterol. Dept., I.M.C., Brussels, Belgium). *Acta Gastroenterol. Belg.* 35(3):81-97, 1972.

3392 THE SECRETORY BACKGROUND TO GASTRIC AND DUODENAL ULCER. *(E.)* Stadelmann, O.; Miederer, S. E.; Stolte, M. (Med. Polyclin., Univ.

Bonn, Germany). *Acta Hepatogastroenterol.* 19(5): 381-385, 1972.

3393 THE DUODENAL PCO_2 IN DUODENAL ULCER PATIENTS AND NORMAL SUBJECTS. *(E.)* Rune, S. J. (Copenhagen Country Hosp., Hellerup, Denmark). *Acta Hepatogastroenterol.* 19(5):386-387, 1972.

3394 SIGNIFICANCE OF ILEUS IN PERFORATED VISCUS. *(E.)* Keeffe, E. J.; Gagliardi, R. A. (St. Joseph Mercy Hosp., Pontiac, Mich.). *Am. J. Roentgenol. Radium Ther. Nucl. Med.* 117(2):275-280, 1973.

3395 RETROPERITONEAL ABSCESS FROM POSTERIOR PERFORATION OF DUODENAL ULCER. *(E.)* Edmondson, H. T.; Terry, Jr., D. B. (VA Hosp., Augusta, Ga.). *J. Med. Assoc. Ga.* 61(11):374-375, 1972.

3396 STRESS ULCER: A PREVENTABLE DISEASE. *(E.)* Chernov, M. S.; Cook, F. B.; Wood, M.; Hale, Jr., H. W. (Maricopa County Gen. Hosp., Phoenix, Ariz.). *J. Trauma* 12(10):831-833, 1972.

3397 PHYSIOLOGICAL RATIONALE FOR MEDICAL TREATMENT OF DUODENAL ULCER. *(E.)* Dobbins, III, W. O. (George Washington Univ. Med. Ctr., Washington, D.C.). *Med. Ann. D.C.* 41(11): 681-683, 1972.

3398 MANAGEMENT OF GASTROJEJUNAL ULCER: A REVIEW OF 106 CASES. *(E.)* Dubois, D. D.; Beahrs, O. H. (Mayo Clin., Rochester, Minn.). *Minn. Med.* 55(10):899-901, 1972.

3399 ARTERIOSCLEROSIS, AMPUTATION AND PEPTIC ULCER. *(E.)* Bouhoutsos, J.; Barabas, A. P.; Martin, P. (Hammersmith Hosp., London, England). *Postgrad. Med. J.* 48(565):671-672, 1972.

3400 CLINICAL TESTING OF A NEW SYNTHETIC PREPARATION (ZOLIMIDINE) IN THE TREATMENT OF GASTRODUODENAL DISEASE. *(Sp.)* Rivero, Fontan, J. L.; Barranco Jimenez, M.; Gomez Parra, M. (1st Med. Clin., Univ. Sevilla, Spain). *Rev. Esp. Enferm. Apar. Dig.* 38(11):103-126, 1972.

3401 STUDY OF UROPEPSINOGEN EXCRETION IN RATS SUBJECTED TO ISOLATION WITH AND WITHOUT STRESS. *(Sp.)* Sanchez de la Cuesta, F.; Monfort, R.; Alemany, J. R.; Aznar, J. (Inst. Ther., Univ. Sevilla, Spain). *Rev. Esp. Enferm. Apar. Dig.* 38(2):163-170, 1972.

3402 CLINICAL AND RADIOLOGICAL DIAGNOSIS AND TREATMENT OF POSTBULBAR ULCER. *(Sp.)* Lopez Gallart, M.; Sebastia Vila, J. L. (Gallart-Mones Sch. Gastrointestinal Dis., Barcelona, Spain). *Rev. Esp. Enferm. Apar. Dig.* 38(2):187-200, 1972.

3403 DIARRHEA ASSOCIATED WITH VARIOUS TYPES OF VAGOTOMY WITH AND WITHOUT SUPPLEMENTAL DRAINAGE. *(Sp.)* de Miguel, J. (no affil.). *Rev. Esp. Enferm. Apar. Dig.* 38(5):595-600, 1972.

3404 GASTRIC SECRETION AND FUROSEMIDE. *(Sp.)* Freytes, M. A.; Morales, H. E.; Blariza, H. R. (1st Dept. Symptomatol., Natl. Univ. Cordoba, Argentina). *Rev. Esp. Enferm. Apar. Dig.* 38(6): 721-724, 1972.

3405 GASTRIC EMPTYING, SECRETION, AND FAT ABSORPTION FOLLOWING UPPER GASTRECTOMY: AN EXPERIMENTAL STUDY. *(Jap.)* Tamaki, Y. (Sch. Med., Tokushima Univ., Japan). *Shikoku Acta Med.* 28(1):1-12, 1972.

3406 CHILDHOOD PEPTIC ULCER: A COMMON ENTITY IN OUR TURNED ON WORLD. *(E.)* Nickey, L. N.; Huchton, P.; Campbell, J. J. (no affil.). *Tex. Med.* 68(10):80-83, 1972.

3407 THE EFFECT OF ENVIRONMENTAL TEMPERATURE ON THE INITIATION OF HEMORRHAGE IN DUODENAL ULCER. *(E.)* Weiss, J. J.; Pollard, H. M. (Dept. Intern. Med., Univ. Michigan, Ann Arbor). *Univ. Mich. Med. Ctr. J.* 38(2):51-53, 1972.

3408 ASSOCIATION BETWEEN MYOCARDIAL INFARCTION AND HISTORY OF GASTRIC RESECTION. *(Ger.)* Grosse, H. (Regional Hosp., Stralsund, Germany). *Z. Gesamte Inn. Med.* 27(15):666-668, 1972.

3409 ACUPUNCTURE, ELECTRIC PHENOMENON OF THE SKIN, AND POSTVAGOTOMY GASTROINTESTINAL ATONY. *(E.)* Matsumoto, T.; Hayes, Jr., M. F. (Hahneman Med. Coll., Philadelphia, Pa.). *Am. J. Surg.* 125(2):176-180, 1973.

3410 JEJUNAL INTERPOSITON AS REMEDIAL OPERATION FOR SEVERE DUMPING SYNDROME. *(E.)* Mendoza, Jr., C. B.; Easley, G. W.; Gerwig, Jr., W. H. (VA Hosp., Clarksburg, W. Va.). *Am. J. Surg.* 125(3): 318-323, 1973.

3411 BLEEDING DUODENAL ULCER IN ELDERLY PATIENTS. *(E.)* Rachlin, L.; Ceide-Echevarria, A. (VA Hosp., Livermore, Calif.). *Am. Surg.* 30(3): 174-176, 1973.

3412 DEATH BY UNDIAGNOSED PERFORATED PEPTIC ULCER: ANALYSIS OF 31 CASES. *(E.)*

Felix, W. R.; Stahlgren, L. H. (VA Hosp., Philadelphia, Pa.). *Ann. Surg.* 177(3):344-351, 1973.

3413 DUODENAL ULCER IN CHILDREN. *(E.)* Robb, J. D. A.; Thomas, P. S.; Orszulok, J.; Odling-Smee, G. W. (Queen's Univ. Belfast, Northern Ireland). *Arch. Dis. Child.* 47(255):688-689, 1972.

3414 AN ENDOSCOPIC TEST FOR COMPLETENESS OF VAGOTOMY. *(E.)* Kusakari, K.; Nyhus, L. M.; Gillison, E. W.; Bombeck, C. T. (Abraham Lincoln Sch. Med., Univ. Illinois, Chicago). *Arch. Surg.* 105(2):386-391, 1972.

3415 THE GASTRECTOMY OPERATION REVISITED WITH AUTOMATED SUTURING DEVICES. *(E.)* Jascalevich, M. E. (Jersey City Med. Ctr., N.J.). *Arch. Surg.* 105(3):524-527, 1972.

3416 VITAMIN A PRETREATMENT OF STRESS ULCERS IN RATS. *(E.)* Rasche, R.; Butterfield, W. C. (Univ. Connecticut Health Ctr., Hartford). *Arch. Surg.* 106(3):320-321, 1973.

3417 COMPLICATIONS FOLLOWING SURGERY FOR DUODENAL ULCER IN OBESE PATIENTS. *(E.)* Postlethwait, R. W.; Johnson, W. D. (VA Hosp., Durham, N.C.). *Arch. Surg.* 105(3):438-440, 1972.

3418 DUODENAL ULCER: CLINICAL FEATURES. GENERAL FACTS ON THE MEDICAL TREATMENT AND PATHOGENESIS OF PEPTIC ULCER. MANAGEMENT OF THE PATIENT. ABSOLUTE INDICATIONS FOR SURGICAL THERAPY. RELATIVE INDICATIONS FOR SURGICAL THERAPY. *(Por.)* Bettarello, A.; Meirrelles, Jr., J. de S.; Talans, S.; Pontes, J. F. (Fac. Med., Univ. Sao Paulo, Brazil). *Arq. Gastroenterol.* 9(3):137-150, 1972.

3419 TRENDS IN THE MORTALITY FROM PEPTIC ULCER IN DENMARK. *(E.)* Sterup, K.; Mosbech, J. (Copenhagen County Hosp., St. Elisabeth, Denmark). *Scand. J. Gastroenterol.* 8(1):49-53, 1973.

3420 A COMPARISON OF CARBENOXOLONE SODIUM AND DEGLYCYRRHIZINATED LIQUORICE IN THE TREATMENT OF GASTRIC ULCER IN THE AMBULANT PATIENT. *(E.)* Wilson, J. A. C. (Salford Hosp. Group, England). *Br. J. Clin. Pract.* 26(12):563-566, 1972.

3421 CARBENOXOLONE IN THE TREATMENT OF DUODENAL ULCER: A MULTICENTRE TRIAL. *(E.)* Hunt, T.; Abrams, M.; Atkinson, M.; Bassadone, E. T.; Bouchier, I. A. D.; Dykes, P.; Hosking, G. E.; McAndrew, G. M.; MacCaig, J. N.; McMillan, R. B.; Read, A. E.; Watkinson, G. (St. Mary's Hosp., London, England). *Br. J. Clin. Pract.* 37(2):50-55, 1973.

3422 CURRENT MANAGEMENT OF PEPTIC ULCER DISEASE. PART I. *(E.)* Bralow, S. P. (Jefferson Med. Coll., Philadelphia, Pa.). *Del. Med. J.* 44(7): 179-187, 1972.

3423 CURRENT MANAGEMENT OF PEPTIC ULCER DISEASE. PART II. *(E.)* Bralow, S. P. (Jefferson Med. Coll., Philadelphia, Pa.). *Del. Med. J.* 44(8): 213-217, 1972.

3424 EFFECT OF VAGOTOMY AND PYLOROPLASTY: THE ORAL GLUCOSE TOLERANCE TEST. *(E.)* Hall, W. H.; Sanders, L. L.; Read, R. C. (VA Hosp., Oklahoma City). *Gastroenterology* 64(2):217-222, 1973.

3425 STRESS ULCER. *(E.)* Brooks, F. P. (Univ. Pennsylvania Sch. Med., Philadelphia). *Hosp. Med.* 9(3):62-65, 1973.

3426 AIR CONTROLLERS SYNDROME: PEPTIC ULCER IN AIR TRAFFIC CONTROLLERS. *(E.)* Grayson, R. R. (no affil.). *Ill. Med. J.* 142(2):111-115; 1972.

3427 PEPTIC ULCER HISTORY AMONG 10,000 ADULT MALES. I. PREVALENCE AND INCIDENCE. *(E.)* Medalie, J. H.; Birnbaum, D.; Goldbourt, U.; Neufeld, H. N.; Riss, E.; Oron, D.; Perlstein, T. (Tel Aviv Univ. Med. Sch., Tel-Hashomer, Israel). *Isr. J. Med. Sci.* 8(10):1673-1679, 1972.

3428 A POPULATION STUDY OF PEPTIC ULCER: ITS RELATION TO VARIOUS ETHNIC AND SOCIO-ECONOMIC FACTORS. *(E.)* Yodfat, Y. (Shimshon Med. Ctr., Kupat Holim, Beit Shemesh, Israel). *Isr. J. Med. Sci.* 8(10):1680-1684, 1972.

3429 EXPERIENCES WITH GASTRECTOMY AND TRUNCAL VAGOTOMY. *(E.)* Den Otter, G. (Free Univ. Hosp., Amsterdam, Netherlands). *J. Abdomin. Surg.* 15(2):34-36, 1973.

See also 3242, 3271, 3288, 3306, 3448, 3538, 3642.

3430 SCANNING ELECTRON MICROSCOPY OF SMALL BOWEL STRANGULATION OBSTRUCTION. *(E.)*

Booth, W. V.; Zimny, M.; Kaufman, H. J.; Cohn, Jr., I. (Louisiana State Univ. Med. Ctr., New Orleans). *Am. J. Surg.* 125(1):129-133, 1973.

Topographic changes occurring in experimental strangulation obstruction have been investigated with the scanning electron microscope. Control specimens revealed broad, tongue-shaped villi on the mucosal surface, but morphologic changes after only 3 hr of strangulation obstruction were obscured by extravasated erythrocytes and cellular debris which covered the normal mucosal surface. The normal serosal surface was irregular and contained 3 varieties of previously undescribed pits which ranged from 1-12 μ in diameter. Loss of serosal mesothelium began 1 hr after strangulation obstrution and was nearly complete after 6 hr. Only intermediate sized pits were observed in the subserosal layer after 1 hr but clefts up to 60 μ in diameter appeared by 3 hr. These serosal defects filled with erythrocytes at six hr, and the bowel wall became covered with a coagulum by 9 hr. The coagulum persisted up to 24 hr, the longest time interval for which specimens were examined. Bacterial toxins and lytic enzymes most probably digest the coagulum, allowing intraluminal material to filter through the intestinal wall through the pits and clefts found in earlier specimens. The discovery of microscopic serosal pits and the observation of a process of early shredding of the bowel wall account for the transfer of toxic intraluminal bowel contents into the peritoneal cavity in strangulation obstruction.

3431 ANTIPERISTALTIC LOOP OF THE SMALL INTESTINE: CRITICAL STUDY OF 10 PERSONAL CASES AND 38 CASES REPORTED IN THE WORLD LITERATURE.

(Fr.) Hollender, L. F.; Kohler, J. J.; Klein, A.; Bur, F. (Univ. Hosp. Ctr., Strasbourg, France). *Ann. Chir.* 26(11/12):599-614, 1972.

Antiperistaltic loops of small intestine, 13-18 cm in length, were inserted in 10 patients who had short-bowel syndrome (2), postvagotomy diarrhea (4), diarrhea after right ileocolectomy (2), ileostomy malfunction (1), and "idiopathic" diarrhea (1). Follow-up periods ranged from 2 to 8 yr. After surgery signs of partial obstruction, lasting 15 and 21 days, resp., developed in 2 patients; increased transit time in 1; episodes of pain in 1; and intestinal perforation with peritonitis in 1. Long-term results of this procedure are evaluated as good in 3 of the 4 patients with postvagotomy diarrhea and in both patients with short-bowel syndrome. From the results obtained in these 10 patients and 38 others reported in the literature, it is concluded that this procedure gave good long-term results in almost 70% of the well-selected patients on whom it was performed. It is recommended for short-bowel syndrome, diarrhea and malabsorption resulting from extensive resections of the small and large intestine, postvagotomy diarrhea and, possibly, ileostomy malfunction.

3432 INTESTINAL MICROFLORA OF IMMUNOGLOBULIN-DEFICIENT AND NORMAL HUMAN SUBJECTS. *(E.)*

Brown, W. R.; Savage, D. C.; Dubois, R. S.; Alp, M. H.; Mallory, A.; Kern, Jr., F. (VA Hosp., Denver, Col.). *Gastroenterology* 62(6):1143-1152, 1972.

Population levels of indigenous microorganisms in the small intestine and feces, and titers of certain antibacterial antibodies in intestinal fluids and sera, were compared in normal and immunoglobulin (Ig)-deficient individuals (9 selectively IgA-deficient subjects (6 males and 3 females, aged 10-60 yr), 3 hypogammaglobulinemic subjects (all male, and 16-51 yr), and 12 healthy subjects). Clinical problems in the 9 IgA-deficient patients included: gluten-sensitive enteropathy (1), dermatomyositis (1), respiratory disease and diarrhea (2), diarrhea and malabsorption (2), ulcerative colitis with biliary cirrhosis and thyroiditis (1), and asthma (1). Clinical problems in the 3 hypogammaglobulinemia patients included: pernicious anemia and giardiasis (1), nodular lymphoid hyperplasia with bronchiectasis and giardiasis (1), and nodular lymphoid hyperplasia (1). Fluids were taken under nitrogen from several levels of the small bowel, and were rigorously protected from exposure to air until cultures for anaerobic bacteria were made. Antibodies were detected by their ability to flocculate bentonite particles coated with lipopolysaccharide antigens extracted from an *Escherichia coli* strain, *Bacteroides* species, or a *Lactobacillus* species. The IgA-deficient and control subjects had generally similar microbial populations in their feces and small bowel fluids, although 2 of the patients had somewhat excessive numbers of anaerobic bacteria from their upper small bowels. In contrast, moderately to greatly excessive numbers of anaerobic bacteria were cultured from the bowel fluids of all 3 hypogammaglobulinemic patients. Titers of the flocculating antibodies were normal in the IgA-deficient patients, but much below normal in the hypogammaglobulinemic persons. Although antibodies may be involved in the complex process regulating the small bowel microbial flora, deficiency of IgA alone is insufficient to allow serious derangement of the flora.

3433 IMMUNOLOGICAL ALTERATIONS IN PATIENTS WITH TREATED WHIPPLE'S DISEASE. *(E.)*

Martin, F. F.; Vilseck, J.; Dobbins, III, W. O., Buckley, III, C. E.; Tyor, M. P. (Duke Univ. Med. Ctr., Durham, N.C.). *Gastroenterology* 63(1):6-18, 1972.

The immunological competence of 9 patients (8 male and 1 female, aged 42-82 yr) with treated Whipple's disease was evaluated 10 months-16 yr after antibiotic therapy; 7 patients were hospitalized and 2 returned as outpatients for partial study. Each patient was in clinical remission. Laboratory studies and measurements of intestinal absorption were normal in the 7 hospitalized patients. Intestinal mucosal biopsies revealed variable numbers of periodic acid-Schiff staining macrophages and macrophage "fingerprint-like" particles in the lamino propria of 6 patients studied by electron microscopy between 10 months and 11 yr after treatment. Similar cells and particles were not present in multiple biopsy sections from the patient studied 16 yr after treatment. In all patients serum immunoglobulin (Ig) concentrations (IgG, IgA, and IgM) and complement activity were normal and immunofluorescent assays of antinuclear factor antibodies were negative. Cutaneous hypersensitivity was assessed by quantitative assay with 23 antigens. Immediate hypersensitivity reactions were slightly depressed, but generally intact. Delayed hypersensitivity reactions were significantly depressed in all 7 patients tested, with 5 patients exhibiting no delayed reactions to all antigens. Phytohemagglutinin-induced tritiated thymidine incorporation by peripheral lymphocytes cultured in autologous plasma was consistently less rapid in 8 patients than in 11 control subjects. These observations suggest that compromised delayed cutaneous hypersensitivity in patients with Whipple's disease is associated with an *in vivo* alteration of lymphocyte function. Impaired delayed hypersensitivity persists at a point in the natural history of Whipple's disease when treated patients are clinically well and exhibit only the variable presence of periodic acid-Schiff positive macrophages in intestinal biopsies.

3434 QUANTITATIVE ANALYSIS OF UNCONJUGATED AND CONJUGATED BILE ACIDS IN DUODENAL FLUID BY DENSITOMETRY AFTER PAPER ELECTROPHORESIS. *(E.)* Kaplowitz, N.; Javitt, N. B. (Cornell Univ. Med. Coll., New York). *J. Lipid Res.* 14(2):224-228, 1973.

A simple paper electrophoretic method has been devised for separating bile acids into 5 groups: unconjugated, glycine conjugated, taurine conjugated, and the sulfate esters of glycine-and taurine-conjugated bile acids. Rapid and accurate qualitative and quantitative determinations of each group are obtained by densitometry after internal standarization and phosphomolybdate color development. The technique can be done in the routine clinical laboratory and is useful for the detection of diseases affecting the enterohepatic circulation of bile acids. The ability of the method to determine relative proportions of glycine and taurine conjugates in fluid aspirated from the duodenum makes it useful in diagnosing patients with disease of the terminal ileum. Quantitation of unconjugated bile acids renders it useful for detecting increased intestinal bacterial activity which is considered responsible for fat malabsorption in blind-loop syndrome.

3435 MACROSCOPICALLY DEMONSTRABLE HETEROTOPIC GASTRIC MUCOSA IN THE DOUDENUM. *(E.)* Johansen, A.; Hansen, O. H. (Bispebjerg Hosp., Copenhagen, Denmark). *Scand. J. Gastroenterol.* 8(1):59-63, 1973.

Six patients with heterotopic gastric mucosa which formed macroscopically demonstrable polyps in the duodenum are described. Patients were 4 males, 2 females, aged 26-84 yr; 1 had simultaneous pancreatic carcinoma. The clinical features were dyspepsia with varying degrees of epigastric pain (3 cases) and heavy gastroduodenal bleeding (4 cases). Fiberoptic examination of the duodenum was performed in 3 patients. The polypoid structures could be visualized clearly, and diagnosis was made by target biopsies. The microscopic examination disclosed a histological pattern indistinguishable from homotopic corpus mucosa. A pathogenetic relation to a high acid secretion is hypothesized.

3436 IMMUNOLOGICAL RESPONSES TO AN INTESTINAL ALLOGRAFT WITH HL-A-IDENTICAL DONOR-RECIPIENT. *(E.)* Fortner, J. G.; Sichuk, G.; Litwin, S. D.; Beattie, Jr., E. J. (Dept. Med., Cornell Univ. Med. Coll., New York, N.Y.). *Transplantation* 14(5):531-535, 1972.

Transplantation of an intestinal allograft from an HL-A-identical donor to a 37-yr-old white female with Gardner's syndrome was free of technical complications. Prior to this time her entire jejunum, ileum, and right to midtransverse colon had been resected for recurrent desmoid tumor. A mild rejection episode caused severe epithelial damage. A sharp increase in circulating IgM levels was present 10 days after transplantation; IgG and IgA values were not affected. Cytotoxic antibodies were not identified. Clinical findings suggestive of a possible graft-versus-host reaction were not substantiated by histopathological findings and by Gm differences existing between donor and recipient. A triad of azathioprine, prednisone, and equine antilymphocyte globulin was used to combat rejection. Prednisone (1 mg/kg/day; diminishing) was withheld until rejection was certain due to danger of activating latent infection. Despite this precaution the patient died with *Escherichia coli* and consumption coagulopathy 72 days after transplantation.

3437 PREOPERATIVE DIAGNOSIS OF A MECKEL'S DIVERTICULUM. *(E.)* Centeno, R.; Bonfield, R. E. (Dept. Radiol., Univ. Michigan, Ann Arbor). *Univ. Mich. Med. Ctr. J.* 38(2):64-66, 1972.

3438 ETIOLOGY AND DIAGNOSIS OF ILEUS FROM THE SURGICAL VIEWPOINT. *(Ger.)* Meissner, K.; Zangl, A. (Provincial Hosp., Salzburg, Austria). *Wien. Z. Inn. Med.* 53(4):199-211, 1972.

3439 RUPTURED INTRAABDOMINAL ANEURYSMS SIMULATING HIGH ILEUS. *(Ger.)* Brucke, P. (1st Surg. Clin., Univ. Vienna, Austria). *Wien. Z. Inn. Med.* 53(5):262-267, 1972.

3440 CAUSES AND DIAGNOSIS OF ILEUS. *(Ger.)* Denck, H. (Munic. Hosp., Wien-Lainz, Austria). *Wien. Z. Inn. Med.* 53(5):274-276, 1972.

3441 FAT AND PROTEIN ABSORPTION AFTER EXTENSIVE RESECTION OF THE SMALL INTESTINE. *(Fr.)* Kiekens, R.; Delgadillo-Lora, G. (Free Univ. Brussels, Belgium). *Acta Gastroenterol. Belg.* 35:151-171, 1972.

3442 ABSORPTION OF SUGARS AFTER EXTENSIVE RESECTION OF THE SMALL INTESTINE. *(Fr.)* Duret, R. L. (no affil.). *Acta Gastroenterol. Belg.* 35:172-180, 1972.

3443 NECROTIZING ENTERITIS. (CONSIDERATIONS WITH REGARD TO 3 CASES). *(Rum.)* Voicu, F.; Voicu, L.; Laky, L. (Hosp. No. 1, Braila, Rumania). *Med. Intern. (Bucur.)* 24(2):235-242, 1972.

3444 PARTIAL INTESTINAL OBSTRUCTION DUE TO PERITONEAL MESOTHELIOMA IN CHRONIC ASBESTOS EXPOSURE. *(E.)* Adelman, H.; Berkson, P.; Sackler, J. P. (Mary Immaculate Hosp. Div., Catholic Med. Ctr. Brooklyn, N.Y.). *N. Y. State J. Med.* 72(18):2332-2334, 1972.

3445 MASSIVE GASTROINTESTINAL BLEEDING DUE TO HEMANGIOMA OF ILEUM. *(E.)* Donato, J. O. (New York Med. Coll., N.Y.). *N. Y. State J. Med.* 72(22):2786-2788, 1972.

3446 DUODENAL DIVERTICULA. *(Sp.)* de Arzua Zulaica, E. (no affil.). *Rev. Esp. Enferm. Apar. Dig.* 38(1):35-66, 1972.

3447 DUODENITIS. *(Sp.)* Vidal Colomer, E. (Santa Cruz and San Pablo Hosp., Barcelona, Spain). *Rev. Esp. Enferm. Apar. Dig.* 38(2):131-162, 1972.

3448 PERFORATED PEPTIC ULCER IN A REDUPLICATED LOOP OF ILEUM. *(E.)* Hardas, K. P. (Fall Birch Hosp., Lostock by Bolton, England). *J. Roy. Coll. Surg. Edinburgh* 17(6):376-378, 1972.

3449 ADENOCARCINOMA OF A MECKEL'S DIVERTICULUM. *(E.)* Lee, P. W. R.; Scott, R. A. P. (Southampton Univ. Med. Sch., England). *J. Roy. Coll. Surg. Edinburgh* 17(6):383-384, 1972.

3450 INTERNAL DUODENAL DECOMPRESSION. *(E.)* Passaro, Jr., E.; Bircoll, M. (VA Wadsworth Hosp. Ctr., Los Angeles, Calif.). *J. Surg. Res.* 13(3):97-101, 1972.

3451 EXPERIMENTAL INTESTINAL ATRESIA IN THE RABBIT FETUS: SEQUENTIAL PATHOLOGICAL STUDIES. *(E.)* Tsujimoto, K.; Sherman, F. E.; Ravitch, M. M. (Montefiore Hosp., Pittsburgh, Pa.). *Johns Hopkins Med. J.* 131(4):287-297, 1972.

3452 FIXATION OF THE INTESTINE IN PARTIAL SITUS INVERSUS. *(Rus.)* Gavriushov, V. V.; Doletskii, S. Ia.; Leniushkin, A. I.; Bliau, O. R. (I.V. Rusakov Munic. Children's Hosp. No. 2, Moscow, USSR). *Khirurgiia (Mosk.).* 48(6):78-82, 1972.

3453 GASTRO-INTESTINAL BLEEDING IN RENDU-OSLER-WEBER'S DISEASE. *(E.)* Lubbers, E. J. C. (St. Radboud Hosp., Nijmegen, Netherlands). *J. Abdomin. Surg.* 15(2):37-40, 1973.

3454 VILLOUS ADENOMA OF THE DUODENUM: A CASE REPORT AND REVIEW OF THE LITERATURE. *(E.)* Saibil, E.; Guttman, F.; Palayew, M. J. (Jewish Gen. Hosp., Montreal, Canada). *J. Can. Assoc. Radiol.* 23(4):257-258, 1972.

3455 CONGENITAL STENOSIS AND ATRESIA OF THE JEJUNUM AND ILEUM. *(E.)* deSa, D. J. (Radcliffe Infirm., Oxford, England). *J. Clin. Pathol.* 25(129):1063-1070, 1972.

3456 SMALL BOWEL BYPASS FOR OBESITY: A DISCUSSION OF FOUR DIFFERENT PROCEDURES. *(E.)* Wills, Jr., C. E. (Wills Mem. Hosp., Washington, Ga.). *J. Med. Assoc. Ga.* 61(9): 322-328, 1972.

3457 THE TREATMENT OF TYPHOID PERFORATION OF THE ILEUM. *(E.)* Mulligan, T. O. (Wesley Guild Hosp., Ilesh, Nigeria). *J. Roy. Coll. Surg. Edinburgh* 17(6):364-368, 1972.

3458 NONSPECIFIC DUODENITIS: A DISTINCT CLINICAL ENTITY? *(E.)* Gelzayd, E. A.; Gelfand, D. W.; Rinaldo, Jr., J. A. (Providence Hosp., Southfield, Mich.). *Gastrointest. Endosc.* 19(3):131-133, 1973.

3459 ADENOCARCINOMA OF THE DUODENUM AND THE GARDNER SYNDROME. *(E.)* Schnur, P.; David, E.; Brown, Jr., P. W.; Beahrs, O. H.; ReMine, W. H.; Harrison, Jr., E. G. (Mayo Clin., Rochester, Minn.). *J.A.M.A.* 223(11):1224-1232, 1973.

3460 "CLOSED" BOWEL RESECTION: ADVANTAGE AND TECHNIQUE. *(E.)* Chaitin, H. (Whitestone Gen. Hosp., N.Y.). *J. Abdomin. Surg.* 14(11):200-203, 1972.

3461 LEIOMYOMA OF THE SMALL INTESTINE: REPORT OF CASE MISTAKEN FOR OVARIAN TUMOR. *(E.)* Cervenka, C. F.; Cervenka, J. D. (Queen Peace Hosp., New Prague, Minn.). *J. Abdomin. Surg.* 15(2):29-30, 1973.

3462 MAGNESIUM DEFICIENCY FOLLOWING EXTENSIVE SMALL GUT RESECTION. *(E.)* Nielsen, J. A.; Thaysen, E. H. (Aalborg Hosp. North, Denmark). *J. Abdomin. Surg.* 15(2):31-33, 1973.

3463 SMALL INTESTINAL MORPHOLOGY IN CHILDHOOD. *(E.)* Walker-Smith, J. (Roy. Alexandra Hosp. Children, Camperdown, Australia). *Arq. Gastroenterol.* 9(3):119-130, 1972.

3464 DUODENAL CARCINOMA DIAGNOSED BY HYPOTONIC DUODENOGRAPHY AND SMALL BOWEL ENEMA. *(E.)* Thomas, E.; Bowey, R. R.; Hislop, I. G.; O'Brien, J. A. (no affil.). *Australas. Radiol.* 15:343-345, 1971.

3465 SHORT-GUT SYNDROME: A REVIEW WITH A CASE REPORT. *(E.)* Mackenzie, G. W.; Boileau, G. R.; St. Clair, W. R. (Natl. Defence Med. Ctr., Ottawa, Canada). *Can. J. Surg.* 16(1):3-11, 1973.

3466 BRUNNER'S GLAND ADENOMA OF THE DUODENUM. *(E.)* Wiseman, N.; Thorlakson, R. H. (Winnipeg Clin., Canada). *Can. J. Surg.* 16(1):41-44, 1973.

3467 LEIOMYOMA OF THE DUODENUM: A CASE REPORT. *(E.)* Saha, S. P.; Roesch, C. B. (no affil.). *J. Fla. Med. Assoc.* 59(11):28-29, 1972.

3468 INTESTINAL INVAGINATIONS IN THE ADULT (19 CASES). *(Fr.)* Otteni, F.; Klein, A.; Hollender, L. F. (Univ. Hosp. Ctr., Strasbourg, France). *Ann. Chir.* 26(11/12):617-621, 1972.

3469 ANATOMICAL CLINICAL STUDY OF 21 PRIMARY MALIGNANT TUMORS OF THE JEJUNUM AND ILEUM. *(Fr.)* Hollender, L. F.; Otteni, F.; Thomas, M.; Bur, F. (Univ. Hosp. Ctr., Strasbourg, France). *Ann. Chir.* 26(11/12):639-648, 1972.

3470 TUBERCULOSIS OF THE DUODENUM, MALABSORPTION, AND PERNICIOUS ANEMIA. *(Fr.)* Bour, H.; Duchier, J.; Guy-Grand, B.; Girault, M. J. (Hotel Dieu, Paris, France). *Ann. Med. Interne (Paris)* 123(5):477-480, 1972.

3471 INCREASE IN SERUM ALKALINE PHOSPHATASE DUE TO REGAN ISOENZYME IN A PATIENT WITH LOCALIZED JEJUNAL LYMPHOMA. *(E.)* Stolbach, L.; Skillman, J.; Goodman, R. (Pondville Hosp., Walpole, Mass.). *Arch. Surg.* 105(3):491-493, 1972.

3472 MITOMYCIN AND THE HEALING OF INTESTINAL ANASTOMOSIS: AN EXPERIMENTAL STUDY IN THE RAT. *(E.)* Wiznitzer, T.; Orda, R.; Bawnik, J. B.; Rippin, A.; Griffel, B.; Herzberg, M. (Ichilov Hosp., Tel Aviv, Israel). *Arch. Surg.* 106(3):314-316, 1973.

3473 ROENTGEN SIGNIFICANCE OF THE DUODENOCOLIC RELATIONSHIPS: AN ANATOMIC APPROACH. *(E.)* Meyers, M. A.; Whalen, J. P. (New York Hosp. Cornell Univ. Med. Ctr., New York). *Am. J. Roentgenol. Radium Ther. Nucl. Med.* 117(2):263-274, 1973.

3474 MANAGEMENT OF A HIGH-RISK INTESTINAL ANASTOMOSIS. *(E.)* Kirkpatrick, J. R.; Rajpal, S. G. (Wayne State Univ. Sch. Med., Detroit, Mich.). *Am. J. Surg.* 125(3):312-315, 1973.

3475 MALPOSITION AND DISPLACEMENT OF THE BOWEL IN RENAL AGENESIS AND ECTOPIA: NEW OBSERVATIONS. *(E.)* Meyers, M. A.; Whalen, J. P.; Evans, J. A.; Viamonte, M. (New York Hosp. Cornell Univ. Med. Ctr., New York). *Am. J. Roentgenol. Radium Ther. Nucl. Med.* 117(2):323-333, 1973.

3476 MULTIPLE JEJUNAL DIVERTICULOSIS AND SMALL BOWEL VOLVULUS. *(E.)* Munyaradzi, O. M.; Wapnick, S. (Godfrey Huggins Sch. Med., Salisbury, Rhodesia). *Am. J. Surg.* 125(3):356-359, 1973.

3477 SMALL INTESTINE CARCINOID. MESENTERIC VASCULAR LESIONS: 3 CASES. *(Fr.)* Hemet, J.; Duval, C.; Jouanneau, P.; Geffroy, Y.; Colin, R. (C. Nicolle Hosp., Rouen, France). *Ann. Anat. Pathol. (Paris)* 17(1):73-82, 1972.

3478 CLINICAL CONSEQUENCES OF EXTENSIVE RESECTIONS OF THE SMALL INTESTINE. *(Fr.)* Paulet, P. (St. Pierre Hosp., Brussels, Belgium). *Acta Gastroenterol. Belg.* 35:131-136, 1972.

3479 WATER AND MINERAL METABOLISM AND ACID-BASE EQUILIBRIUM IN EXTENSIVE RESECTIONS OF THE SMALL INTESTINE. *(Fr.)* Paulet, P. (St. Pierre Hosp., Brussels, Belgium). *Acta Gastroenterol. Belg.* 35:145-150, 1972.

3480 DUODENAL LIPOMA: A REPORT OF TWO CASES WITH A REVIEW OF THE LITERATURE. *(E.)* Munson, F. A. (VA Hosp., Martinez, Calif.). *Am. J. Gastroenterol.* 58(6):613-618, 1972.

3481 ULCERATION AND STRICTURE OF THE JEJUNUM IN A PATIENT ON LONG-TERM INDOMETHACIN THERAPY: REPORT OF A CASE. *(E.)* Sturges, H. F.; Krone, C. L. (Univ. Ariz. Coll. Med., Tucson). *Am. J. Gastroenterol.* 59(2):162-169, 1973.

3482 INTESTINAL TRANSPLANTATION. *(E.)* Ruiz, J. O.; Lillehei, R. C. (Univ. Minnesota Health Sci. Ctr., Minneapolis). *Am. J. Proctol.* 23(5):379-393, 1972.

See also 2983, 2989, 3044, 3080, 3251, 3283, 3284, 3294, 3295, 3310, 3377, 3510, 3511, 3512, 3513, 3526, 3531, 3533, 3564, 3584, 3624, 3627, 3818, 3823, 3857, 3861, 3892.

SMALL INTESTINE

Regional Enteritis

3483 PATTERNS OF BILE ACIDS AND MICROFLORA IN THE HUMAN SMALL INTESTINE. I. BILE ACIDS. *(E.)* Mallory, A.; Kern, Jr., F.; Smith, J.; Savage, D.; (Univ. Colorado Sch. Med., Denver, Col.). *Gastroenterology* 64(1):26-33, 1973.

Bile acids were studied in the intestinal contents of 12 normal controls, 8 patients with ileal resection, and 3 patients with intestinal stasis. The diagnoses for the 8 ileal resection patients were: regional enteritis (5); ileal obstruction (one of unknown cause and one duodenal diverticulum); and radiation enteritis (1). Diagnoses for the 3 intestinal stasis patients were: multiple diverticula of the duodenum, jejunum, and ileum (1); duodenal diverticulum and a Billroth I gastrectomy (1); and scleroderma (1). Intestinal fluids were aspirated from the duodenum after cholecystokinin stimulation (75 U i.v.) and from 4 additional sites in the small intestine, 50 cm apart, 4-7 hr after a meal. The total concentrations of bile acids and their conjugates were determined by enzymatic assay. The distribution of bile acids was measured by gas-liquid chromatography. The results were examined in relation to the intestinal microflora cultured from the same samples. Bile acid concentrations were lower in the duodenum of patients with ileal resection. Throughout the small intestine there was a marked decrease in bile salts conjugated with taurine and a smaller decrease of glycine-conjugated bile salts. In addition, the percentage of chenodeoxycholic acid was clearly increased at all levels, while the percentage of deoxycholic acid was decreased. In the 2 patients with any deoxycholic or lithocholic acid, anaerobic organisms, such as *Bacteroides*, were abundant in most areas in the small intestine. In the 3 patients with intestinal stasis the total duodenal bile acid concentrations were similar to those in the controls, but throughout their small intestine there was a modest decrease in taurine-conjugated bile acids and a definitely increased proportion of deoxycholic and lithocholic acids. The proportion of unconjugated bile acids was not clearly increased in any patient studied.

3484 IMPAIRED LYMPHOCYTE RESPONSIVENESS IN INFLAMMATORY BOWEL DISEASE. *(E.)* Sachar, D. B.; Taub, R. N.; Brown, S. M.; Present, D. H.; Korelitz, B. I.; Janowitz, H. D. (Mt. Sinai Hosp., New York). *Gastroenterology* 64(2):203-209, 1973.

The *in vitro* responsiveness of circulating lymphocytes to phytohemagglutinin was studied in patients with Crohn's disease (44, of whom 25 had regional ileitis, 14 ileocolitis, and 5 granulomatous colitis); ulcerative colitis (14, 2 of whom had localized proctitis, 6 more extensive but only left-sided disease, and 6 universal proctocolitis); and normal controls (21). A separate study was made of 16 patients (14 with Crohn's disease and 2 with ulcerative colitis) who were receiving prednisone (10-40 mg/day). Lymphocyte responsiveness was impaired in about 1/3 of all patients with inflammatory bowel disease, Crohn's disease, and ulcerative colitis. This phenomenon of depressed lymphocyte responsiveness did not correlate with anatomical extent, duration, or activity of disease, nor with the presence or absence of lymphopenia. The phenomenon was not attributable to a plasma factor nor to treatment with salicylazosulfapyridine. It is concluded that impaired lymphocyte responsiveness reflects an intrinsic defect of the immunocyte system which occurs in patients with both Crohn's disease and ulcerative colitis.

3485 LYMPHOCYTE TRANSFORMATION IN THE MESENTERIC LYMPH NODES OF PATIENTS WITH CROHN'S DISEASE. *(E.)* Guillou, P. J.; Brennan, T. G.; Giles, G. R. (Univ. Dept. Surg., Leeds, England). *Gut* 14(1):20-24, 1973.

The response of lymphocytes from peripheral blood and mesenteric lymph nodes to stimulation with phytohemagglutinin *in vitro* has been studied in 8 patients with active Crohn's disease. Of the 8, 6 had ileocecal involvement of long standing, and 2 had recurrent ileitis just proximal to a previous resection. Patients with Crohn's disease showed less pronounced stimulation than control subjects. The mean transformation rate of the peripheral blood lymphocytes in patients with Crohn's disease was 35.8%; the difference between this and the control subjects' rate (48.3%) was highly significant. The lymphocyte transformation rate for Crohn's disease patients was 28.8% and for controls, 48.8%. The impaired responses of circulating lymphocytes from these patients were marked on culture in autologous serum and were not improved by culture in homologous AB serum. Lymphocytes from lymph nodes directly draining diseased bowel exhibited lower response than those from nodes at the root of the mesentery, which in turn were lower than those of circulating lymphocytes. This study suggests that enlarged nodes result from an immunological process involving bone-marrow-derived lymphocytes.

3486 GASTROINTESTINAL MANIFESTATIONS OF CHRONIC GRANULOMATOUS DISEASE. *(E.)* Ament, M. E.; Ochs, H. D. (Dept. Med., Univ. Washington, Seattle). *N. Engl. J. Med.* 288(8): 382-387, 1973.

Of 9 patients (7 male and 2 female, aged 14 months-16 yr) with chronic granulomatous disease, 4 had gastrointestinal symptoms: in 3 perianal fistulas developed, and 2 had friable rectal mucosa. All 4 had vitamin B_{12} malabsorption, and 2 had steatorrhea. In addition, 2 asymptomatic patients had malabsorption of vitamin B_{12}. In 8 of the 9 cases characteristic histiocytes were found in rectal biopsies; the appearance of these histiocytes is suggestive of chronic granulomatous disease but not invariably diagnostic. Histiocytes with the same appearance were noted in 7 of the 8 patients undergoing small-bowel biopsy. Histiocytes are rarely seen by light microscopy in the jejunal mucosa of normal persons. Thus, their presence in jejunal biopsies strongly suggests the disease. Granulomas were found in the rectal mucosa and could not be morphologically differentiated from granulomas seen in Crohn's disease.

3487 RECTAL BIOPSY IN CROHN'S DISEASE. *(E.)* Crucioli, V. (St. Mark's Hosp., London, England). *Rendic. Gastroenterol.* 4(2): 73-80, 1972.

A retrospective study was made of biopsies from 36 patients with ileal, colonic, and rectal Crohn's disease to study the relation between the site of involvement and the rectal histology and to correlate the sigmoidoscopy appearances with the microscopic changes. The appearance of sarcoid tissue varied from 0% in patients with small bowel disease to 58% in those with rectal involvement. In patients with colonic disease sparing the rectum, there was a dissociation between normal sigmoidoscopy and abnormal rectal biopsy. There was an increase of lymphoid tissue throughout the mucosa and submucosa which was hyperplastic and associated with patchy or diffuse edema. Mild mucosal inflammation can also be edema. Mild mucosal inflammation can also be present, but with a relatively normal goblet cell population. These changes are not likely to be seen in ulcerative colitis. The results show that rectal biopsy should be performed in the presence of a normal sigmoidoscopy appearance in a patient with suspected colonic Crohn's disease but no rectal involvement. Sarcoid granulomas can be detected but so can other signs, such as lymphoid tissue hyperplasia, focal edema, and disproportionate inflammation. Although these are not specific criteria, they can be helpful in distinguishing Crohn's disease from ulcerative colitis and other inflammatory bowel disorders.

3488 LYMPHOCYTE TRANSFORMATION AND DELAYED HYPERSENSITIVITY IN CROHN'S DISEASE. *(E.)* Ropke, C. (Rigshospital, Copenhagen, Denmark). *Scand. J. Gastroenterol.* 7(7):671-677, 1972.

Lymphocytes from 19 patients with Crohn's disease and from 28 healthy controls were cultured *in vitro* with phytohemagglutinin (PHA) or purified protein derivative. There were 10 women and 9 men, aged 18-51 yr; 9 had lesions in both ileum and colon, 8 had lesions in the ileum, and 2 had lesions in the colon. Cells from patients were stimulated to the same degree as normal cells by these agents when cultured for 3 days. No difference was found between the 2 groups when cells were cultured for various periods of time or in the presence of different PHA concentrations. Factors reducing lymphocyte transformation were not detected in the serum of the patients. The Mantoux reactions of the Crohn patients were found comparable to those of 51 patients with various other diseases. These results contrast with earlier findings of depressed delayed hypersensitivity in Crohn's disease.

3489 BIOCHEMICAL ANALYSIS OF THE INTESTINAL WALL IN A CASE OF REGIONAL ENTERITIS (CROHN'S DISEASE). *(E.)* Seppala, P. O.; Viljanto, J.; Lehtonen, A. (Dept. Med., Univ. Turku, Finland). *Acta Chir. Scand.* 139(1):79-83, 1973.

3490 GRANULOMATOUS COLITIS IN THE ELDERLY. *(E.)* Hoffman, W. A.; Rosenberg, M. A. (Yale Univ. Sch. Med., New Haven, Conn.). *Am. J. Gastroenterol.* 58(5):508-518, 1972.

3491 AMYLOIDOSIS ASSOCIATED WITH CROHN'S DISEASE. *(E.)* Madjlessi, S. H.; Brown, C. H.; Hawk, W. A. (Cleveland Clin. Fdn., Ohio). *Am. J. Gastroenterol.* 58(6):563-577, 1972.

3492 GENITOURINARY COMPLICATIONS OF GRANULOMATOUS BOWEL DISEASE. *(E.)* Bagby, R. J.; Clements, Jr., J. L.; Patrick, J. W.; Rogers, J. V.; Weems, H. S. (Emory Univ. Sch. Med., Atlanta, Ga.). *Am. J. Roentgenol. Radium Ther. Nucl. Med.* 117(2):297-306, 1973.

3493 MESENTERIC LYMPHATICS IN REGIONAL ENTERITIS. *(E.)* Lorenzo, G. A.; Poticha, S. M.; Beal, J. M. (Northwestern Univ. Med. Ctr., Chicago, Ill.). *Arch. Surg.* 105(2): 375-378, 1972.

3494 CANINE COLITIS COMPARABLE TO REGIONAL ENTERITIS AND MUCOSAL COLITIS OF MAN. *(E.)* Van Kruiningen, H. J. (Dept. Anim. Dis., Univ. Connecticut, Storrs). *Gastroenterology* 62(6):1128-1142, 1972.

3495 REGIONAL ENTERITIS AND SARCOIDOSIS IN ONE PATIENT: A CASE REPORT. *(E.)* Padilla, A. J.; Sparberg, M. (Northwestern Univ. Med. Sch., Chicago, Ill.). *Gastroenterology* 63(1):153-160, 1972.

3496 REPROCESSING OF WAX-EMBEDDED TISSUE BLOCKS FOR THE ELECTRON MICROSCOPE APPLIED TO CROHN'S DISEASE. *(E.)* Watson, T.; Fulker, M. J.; Cook, M. G. (Dept. Exp. Pathol. Cancer Res., Leeds Univ., England). *J. Clin. Pathol.* 25(10):914-916, 1972.

3497 ROLE OF THE COLON IN ILEAL-RESECTION DIARRHOEA. *(E.)* Cummings, J. H.; James, W. P. T.; Wiggins, H. S. (Central Middlesex Hosp., London, England). *Lancet* (7799):344-347, 1973.

3498 ORAL MANIFESTATIONS IN CROHN'S DISEASE: REPORT OF A CASE. *(E.)* Eisenbud, L.; Katzka, I.; Platt, N. (Long Island Jewish Hillside Med. Ctr., New Hyde Park, N.Y.). *Oral Surg.* 34(5):770-773, 1972.

3499 ANAEMIA IN CROHN'S DISEASE. *(E.)* Dyer, N. H.; Child, J. A.; Mollin, D. L.; Dawson, A. M. (St. Bartholomew's Hosp., London, England). *Q. J. Med.* 41(164):419-436, 1972.

See also 3336, 3434, 3606, 3610, 3612, 3613, 3616, 3618, 3666.

SMALL INTESTINE

Malabsorption

3500 INVESTIGATION OF POSSIBLE INTESTINAL PEPTIDASE DEFICIENCY IN COELIAC DISEASE. *(E.)* Cornell, H. J.; Townley, R. R. W. (Roy. Children's Hosp., Melbourne, Australia). *Clin. Chim. Acta* 43(1):113-125, 1973.

The possibility that patients with celiac disease may lack an enzyme normally involved in the later stages of digestion of certain components of gliadin was examined. Pepsin, trypsin and pancreatin were used to digest gliadin from wheat gluten and the resultant peptides were separated into 13 fractions by ion exchange chromatography. Fraction 9 components were digested to a lesser extent by duodenal mucosa from celiac children in remission than by normal mucosa. All other fractions were equally well digested. After digestion of fraction 9 with celiac mucosa the major amino acids remaining were glutamine/glutamic acid, proline and serine. The suggests that an intestinal peptidase deficiency may be the cause of celiac disease. Re-chromatography of Fraction 9 yielded 2 major sub-fractions each containing peptides having leucine and glutamine as the major N-terminal amino acids.

3501 IDENTIFICATION OF SOME ENTERIC BACTERIA WHICH CONVERT OLEIC ACID TO HYDROXYSTEARIC ACID IN VITRO. *(E.)* Thomas, P. J. (Mayo Clin., Rochester, Minn.). *Gastroenterology* 62(3):430-435, 1972.

Hydroxy fatty acids, formed by hydration of unabsorbed, dietary, unsaturated fatty acids, probably catalyzed by intestinal bacteria, are found in the fecal fat of patients with steatorrhea. These acids were studied as possible contributors to the diarrhea which is frequently associated with fat malabsorption. Twenty-six pure cultures of bacteria were tested for their ability to hydrate oleic acid *in vitro*. Of the 22 anaerobic species, 7 (principally of the genus Clostridium) and 1 of the 4 aerobic species *(Streptococcus faecalis)* rapidly converted oleic acid to hydroxy-stearic acid. In samples taken up to 24 hr after ^{14}C-oleic acid addition, more than 90% of the recovered radioactivity was localized in areas corresponding to methyl esters of hydroxy or unsubstituted acids. After 48-72 hr, indication of nonspecific breakdown or, incorporation of the label into hydrophilic products was seen. The organisms were divided in 2 groups, those which could hydrate oleic acid rapidly and those which could not. The non-incorporation of oleic or hydroxystearic acids into any phospholipid or glyceride, suggests that hydroxystearic acid is not a normal component of bacterial intracellular lipids.

3502 NONGRANULOMATOUS ULCERATIVE JEJUNOILEITIS WITH HYPOGAMMAGLOBULINEMIA. CLINICAL REMISSION AFTER TREATMENT WITH γ-GLOBULIN. *(E.)* Corlin, R. F.; Pops, M. A. (UCLA Sch. Med., Los Angeles, Calif.). *Gastroenterology* 62(3):473-478, 1972.

A 51-yr-old female with nongranulomatous ulcerative jejunoileitis associated with hypogammaglobulinemia was studied. Severe hypogammaglobulinemia was noted to persist despite clinical remission and disappearance of any evidence of protein-losing enteropathy. Despite clinical improvement, the small bowel biopsy continued to reveal nonspecific abnormalities. A review of the literature shows the existence of hypogammaglobulinemia in 4 of 5 cases previously studied. The persistence of low levels of immunoglobulins raises the possibility that hypogammaglobulinemia may be implicated in the pathogenesis of nongranulomatous ulcerative jejunoileitis.

3503 SELECTIVE INHIBITION OF VITAMIN B_{12} ABSORPTION BY PARA-AMINOSALICYLIC ACID. *(E.)* Toskes, P. P.; Deren, J. J. (Dept. Med., Univ. Pennsylvania, Philadelphia). *Gastroenterology* 62(6):1232-1237, 1973.

A 50-yr-old male is described whose present condition plus his past history of inadequately treated tuberculosis and a strongly positive skin test prompted the start of isoniazid, streptomycin, and para-aminosalicylic acid (PAS) therapy. PAS (8 g/day p.o.) caused persistent vitamin B_{12} malabsorption with urinary excretion values from 2-4.4%. PAS did not alter intestinal morphology, intestinal maltase or sucrase activities, xylose excretion, or lead to steatorrhea. Thus, PAS should be added to the list of pharmacological agents that may induce reversible malabsorption of vitamin B_{12}.

3504 IMPAIRED CHOLECYSTOKININ-PANCREOZYMIN SECRETION, INTRALUMINAL DILUTION, AND MALDIGESTION OF FAT IN SPRUE. *(E.)* DiMagno, E. P.; Go, V. L. W.; Summerskill, W. H. J. (Mayo Clin., Rochester, Minn.). *Gastroenterology* 63(1): 25-32, 1972.

Healthy volunteers (17 men and 2 women, aged 21-55) and 16 patients (6 men and 10 women, aged 26-70) with nontropical sprue were studied with intraduodenal perfusion of 78 mM essential amino acids, test meals, or both. The jejunal biopsy of each patient revealed villous atrophy, surface cell changes, and plasma cell infiltration of the lamina propria. All but 2 had steatorrhea. Impaired secretion of cholecystokinin-pancreozymin was identified in patients with nontropical sprue, and was attributed to mucosal damage of the small intestine. Outputs of pancreatic enzymes and gallbladder contents in response to essential amino acids in the duodenum were reduced in sprue, although gallbladder and pancreatic function were normal after i.v. cholecystokinin-pancreozymin secretion in sprue on the components of fat digestion were tested after administering 2 test meals. In early postprandial periods, pancreatic lipase and bile acid concentrations were diminished, and these abnormalities were later intensified by excessive dilution of the meal. Impairment of fat digestion was greater after the feeding of the second meal, correlated best with decreases in intraluminal bile acid concentration and micellar lipid, rather than lipase deficiency, and may contribute to steatorrhea in some patients with sprue.

3505 INFLUENCE OF DIETARY FAT ON FECAL FAT. *(E.)* Walker, B. E.; Kelleher, J.; Davies, T.; Smith, C. L.; Losowsky, M. S. (St. James's Hosp., Leeds, England). *Gastroenterology* 64(2): 233-239, 1973.

The effect of a change in the amount of dietary fat intake on fecal fat excretion has been assessed in patients with mild or borderline steatorrhea and in 4 normal young adults. The highest fat intake was 174g, and only 7 of 71 diets exceeded 150g/day. In 25 of 28 patients studied and in all normal subjects fecal fat excretion increased with increasing fat intake and was independent of the order in which the diets were given. After a change from a low to a high fat diet, the increase in fecal fat output in g/day was highly significant, but there was no consistent change when expressed as percentage of dietary fat excreted. In the patients, a similar effect was observed whether or not the total calorie intake was altered. It is concluded that fecal fat is most usefully expressed as a percentage of dietary fat excreted/day, since fecal fat is, to a considerable extent, influenced by the amount of dietary fat.

3506 ULTRASTRUCTURAL CHANGES SUGGESTIVE OF IMMUNE REACTIONS IN THE JEJUNAL MUCOSA OF COELIAC CHILDREN FOLLOWING GLUTEN CHALLENGE. *(E.)* Shiner, M. (Central Middlesex Hosp., London, England). *Gut* 14(1):1-12, 1973.

The jejunal mucosa of 8 celiac children (6 female, 2 male, aged 12 months-8 yr) on a gluten-free diet from 6 months to 5 1/2 yr, and 2 non-celiac children was studied by light and electron microscopy 2-98 hr after a single challenge dose of gluten (7-20 g p.o. or intraduodenally). In all celiac patients the early cytopathological reactions were principally confined to the structures within the subepithelial connective tissue. Changes were observed in the connective tissue fibrils, the basement membranes of epithelial and endothelial cells, the endothelium of small blood vessels, and the type and degree of inflammatory cell infiltration. The timing of these reactions was compatible with the concept that gluten acts as an antigen and combines with antibody in the form of immune complexes in the connective tissue close to the epithelium and to small blood vessels. These changes appeared to precede epithelial cell damage. No subepithelial tissue changes were seen in the non-celiac patients after gluten challenge.

3507 COELIAC DISEASE IN CHILDREN OF ASIAN IMMIGRANTS. *(E.)* Nelson, R.; McNeish, A. S.; Anderson, C. M. (Dept. Pediatr. Child Health, Univ. Birmingham, England). *Lancet* (7799):348-350, 1973.

Seventeen cases of celiac disease have been found in children of Asian immigrants to Great Britain. The age of these patients ranged from 8 months-14 yr (mean 4.9 yr); 10 were females and 7 were males. Their parents originated from the Punjab or West Pakistan. These communities may have a frequency of childhood celiac disease comparable to white children in Britain. Growth failure, weight loss, diarrhea, abdominal distension, and anemia were common symptoms. Of the 17 children, 6 had active rickets, 1 had hypocalcemia, 1 had raised alkaline phosphatase levels with no bone abnormality, 14 had steatorrhea, 15 were iron deficient, and 9 also had folic acid deficiency. It is suggested that celiac disease may be an etiological factor in some cases of rickets in immigrant children.

3508 INTRALUMINAL AND MUCOSAL STARCH DIGESTION IN CONGENITAL DEFICIENCY OF INTESTINAL SUCRASE AND ISOMALTASE ACTIVITIES. *(E.)* Auricchio, S.; Ciccimarra, F.; Moauro, L.; Rey, F.; Jos, J.; Rey, J. (Pediatr. Clin. II, Univ. Naples, Italy). *Pediatr. Res.* 6:832-839, 1972.

A study was made of 10 patients with congenital deficiency of intestinal sucrase and isomaltase activities. The intraluminal α-amylolysis of amylopectin was normal. It was incomplete during the 1st year of life, both in patients and in controls, as a consequence of the lower α-amylase activity in this age group. Maltotriose was well tolerated in two normal controls, aged 32 and 3 months, and in one 31-month-old patient: in these subjects an oral tolerance test with the trisaccharide was followed by a rapid increase of blood glucose (46-58 mg/100 ml) and did not cause diarrhea. However, in a 6-month-old patient fermentative diarrhea and a small increase of blood glucose (24 mg/100 ml) followed oral load with maltotriose. In all patients, enzyme assays on intestinal biopsy specimens showed that the glucamylase activity of the heat-resistant maltase(s) was normal, while that of the sucrase-isomaltase complex was decreased. There results suggest that starch malabsorption in congenital sucrose and isomaltose intolerance results from deficiency of the enzymatic activities of the sucrase-isomaltase complex involved in starch digestion.

3509 LOW PLASMA TOCOPHEROL LEVELS IN PATIENTS WITH GASTROINTESTINAL DISORDERS. *(E.)* Goransson, G.; Norden, A.; Akesson, B. (Dept. Surg., Univ. Lund, Sweden). *Scand. J. Gastroenterol.* 8(1):21-25, 1973.

Plasma tocopherol levels below 0.60 mg/100 ml were found in 29 patients. Diagnoses included: celiac disease (7, complicated by liver disease and diabetes in 1 case, dermatitis herpatiformis in 1, alcoholism in 1, and Takayashu's syndrome and disturbed fibrinolysis in 1); alcoholism and diabetes (2, associated with chronic pancreatitis in 1 and hypochlorhydria in the other); protein-losing enteropathy (1); low production of bile salts (1); cirrhosis and hepatic coma (1); irritable colon (1); megaloblastic anemia with colonic diverticulosis, myelopathy, and polyneuropathy (1); malabsorption (4, with cirrhosis in 1, diabetes in 1, and pernicious anemia and hypogammaglobulinemia in 1); chronic lymphatic leukemia (1); stomach ulcer with liver neoplasm, colonic melanosis, and chronic lymphatic leukemia (1); Crohn's disease (3); pernicious anemia (2, with diabetes in 1 and hypertension in the other); ulcerative colitis with hiatus hernia (1); muscular dystrophy with hyperthyroidism and epilepsy (1); steatorrhea with stomach neoplasm and osteomalacia (1); and diarrhea with pernicious anemia (1). Abnormal tocopherol metabolism may result from defective bile salt production or biliary obstruction, or from a retarded production of β-lipoproteins. When the tocopherol level was below 0.225 mg/100 ml, gastrointestinal disease had been present for at least 9 months previously. Substitution therapy with tocopherol (vitamin E) is recommended in such cases.

3510 UPTAKE OF VITAMIN B_{12} BY INTESTINAL BACTERIA IN THE STAGNANT LOOP SYNDROME. *(E.)* Schjonsby, H.; Drasar, B. S.; Tabaqchali, S.; Booth, C. C. (Haukeland Hosp., Bergen, Norway). *Scand. J. Gastroenterol.* 8(1):41-47, 1973.

Following a test meal, prepared by mixing 13 ml human gastric juice with 1 μg of ^{57}Co-vitamin B_{12} and adding distilled water to 300 ml, the radioactivity in deposits of centrifuged ileal aspirates was markedly higher in 4 patients with jejunal diverticulosis and vitamin B_{12} malabsorption than in 3 patients with jejunal diverticulosis and normal vitamin B_{12} absorption, 1 patient with partial gastrectomy, and 2 healthy volunteers. Neomycin treatment of 1 patient with jejunal diverticulosis and vitamin B_{12} malabsorption resulted in improved vitamin B_{12} absorption, reduced radioactivity in the ileal deposits, and decreased concentration of anaerobic bacteria in ileum. When bacteria isolated from the abnormal intestinal flora of patients with jejunal diverticulosis and vitamin B_{12} malabsorption were grown in pure cultures, most bacteria, excepting *Bacteroides* and coliforms, were unable to take up intrinsic-factor-bound ^{57}Co-vitamin B_{12}.

3511 CALCIUM, PHOSPHORUS, MAGNESIUM, IRON AND VITAMINS. IMPAIRMENT OF THEIR ABSORPTION IN PATIENTS WITH RESECTIONS OF THE SMALL INTESTINE. *(Fr.)* Barbier, P. (Univ. Med. Clin., St. Pierre Hosp., Brussels, Belgium). *Acta Gastroenterol. Belg.* 35:137-144, 1972.

3512 FLORA OF THE SMALL INTESTINE AFTER EXTENSIVE INTESTINAL RESECTIONS. *(Fr.)* Mainguet, P. (Univ. Med. Clin., St. Pierre Hosp., Brussels, Belgium). *Acta Gastroenterol. Belg.* 35:210-215, 1972.

3513 MEDICAL AND DIET THERAPY OF EXTENSIVE RESECTION OF THE SMALL INTESTINE. *(Fr.)* Fiasse, R. (St. Pierre Univ. Clin., Louvain, Belgium). *Acta Gastroenterol. Belg.* 35:225-244, 1972.

3514 SMALL INTESTINAL DEFICIT IN PELLAGRA. *(E.)* Mehta, S. K.; Kaur, S.; Avasthi, G.; Wig, N. N.; Chhuttani, P. N. (Postgrad. Inst. Med. Educ. Res., Chandigarh, India). *Am. J. Clin. Nutr.* 25(6):545-549, 1972.

3515 FAILURE OF RESPONSE TO N^5-METHYLTETRAHYDROFOLATE IN COMBINED FOLATE AND B_{12} DEFICIENCY: EVIDENCE IN SUPPORT OF THE "FOLATE TRAP" HYPOTHESIS. *(E.)* Gutstein, S.; Bernstein, L. H.; Levy, L.; Wagner, G. (Montefiore Hosp., Bronx, N.Y.). *Am. J. Dig. Dis.* 18(2):142-146, 1973.

3516 SMALL INTESTINAL DISEASE, FOLATE DEFICIENCY ANEMIA, AND ORAL CONTRACEPTIVE AGENTS. *(E.)* Johnson, G. K.; Geenen, J. E.; Hensley, G. T.; Soergel, K. H. (Milwaukee County Gen. Hosp., Wisc.). *Am. J. Dig. Dis.* 18(3):185-190, 1973.

3517 INTESTINAL MALABSORPTION IN MALNOURISHED CHILDREN BEFORE AND DURING RECOVERY: RELATION BETWEEN SEVERITY OF PROTEIN DEFICIENCY AND THE MALABSORPTION PROCESS. *(E.)* Viteri, F. E.; Flores, J. M.; Alvarado, J.; Behar, M. (Inst. Nutr. Central Amer. Panama, Guatemala). *Am. J. Dig. Dis.* 18(3):201-211, 1973.

3518 JEJUNAL DISACCHARIDASE ACTIVITY IN MATURITY ONSET DIABETES. *(E.)* Chaudhary, M. A.; Olsen, W. A. (VA Hosp., Madison, Wisc.). *Am. J. Dig. Dis.* 18(3):199-200, 1973.

3519 GENERALIZED MALABSORPTION, FAILURE TO THRIVE, AND MEGALOBLASTIC ANEMIA: RESULT OF CYANOCOBALAMIN DEFICIENCY. *(E.)* Walters, T. R.; Koch, H. F. (New Jersey Med. Sch., Newark). *Am. J. Dis. Child.* 124(5):766-768, 1972.

3520 EOSINOPHILIC GASTROENTERITIS: REPORT OF A CASE WITH PROTEIN-LOSING ENTEROPATHY. *(E.)* Gregg, J. A.; Luna, L. (New England Deaconess Hosp. Med. Ctr., Boston, Mass.). *Am. J. Gastroenterol.* 59(1):41-47, 1973.

3521 GASTROINTESTINAL INTOLERANCE TO COW'S-MILK PROTEIN IN INFANTS. STUDY OF 15 CASES. *(Fr.)* Despres, P.; Plainfosse, B.; Papiernik, M.; Seringe, P. (Hosp. Sick Children, Paris, France). *Ann. Pediatr. (Paris)* 47(26):1702-1720, 1971.

3522 PANCREATIC EXOCRINE ENZYME DEFICIENCY ASSOCIATED WITH ASPHYXIATING THORACIC DYSTROPHY. *(E.)* Karjoo, M.; Koop, C. E.; Cornfeld, D.; Holtzapple, P. G. (Children's Hosp., Philadelphia, Pa.). *Arch. Dis. Child.* 48(2):143-146, 1973.

3523 CONTROLLED MEASURES OF EXPLORATORY MOVEMENT IN A COELIAC CHILD DURING GLUTEN WITHDRAWAL. *(E.)* Challacombe, D. N.; MacCulloch, M. J.; Birtles, C. J. (Inst. Child Health, (Univ. Birmingham, England). *Arch. Dis. Child.* 47(255):823-826, 1972.

3524 DIFFERENTIAL DIAGNOSIS OF WHIPPLE'S DISEASE AND SARCOIDOSIS: CLINICAL AND BIOPSY EXAMINATIONS. *(Ger.)* Otto, H. F.; Siemssen, S.; Sill, V. (Pathol. Inst., Univ. Hamburg, Germany). *Dtsch. Med. Wochenschr.* 97(36):1343-1347, 1972.

3525 SPECIFICITY OF THE EFFECTS OF A FRUCTOSE-FREE DIET ON THE ACTIVITY OF INTESTINAL α-GLUCOSIDASES IN MAN: A STUDY IN HEREDITARY FRUCTOSE INTOLERANCE. *(E.)* Schmitz, J.; Odievre, M.; Rey, J. (Hosp. Sick Children, Paris, France). *Gastroenterology* 62(3):389-392, 1972.

3526 OSTEOMALACIA ASSOCIATED WITH CHOLESTYRAMINE THERAPY FOR POSTILEECTOMY DIARRHEA. *(E.)* Heaton, K. W.; Lever, J. V.; Barnard, D. (Bristol. Roy. Infirm., England). *Gastroenterology* 62(4):642-646, 1972.

3527 MALABSORPTION SYNDROME IN INFANTS AND CHILDREN. *(Gr.)* Charalambides, V. A. (no affil.). *Iatriki* 21(1):53-60, 1972.

3528 INSULIN SECRETION IN KWASHIORKOR. *(E.)* Jaya Rao, K. S.; Raghuramulu, N. (Natl. Inst. Nutr., Hyderabad, India). *J. Clin. Endocrinol. Metab.* 35(1):63-66, 1972.

3529 ABNORMAL REBUCK SKIN WINDOW RESPONSE IN KWASHIORKOR. *(E.)* Freyre, E. A.; Chabes, A.; Poemape, O.; Chabes, A. (Natl. Univ. San Agustin, Arequipa, Peru). *J. Pediatr.* 82(3):523-526, 1973.

3530 A CASE OF MALABSORPTION SYNDROME COMPLICATED BY NEUROGENIC MUSCULAR PARESIS. *(Pol.)* Chmielowa, M.; Socha, J. (Acad. Med., Poznan, Poland). *Pol. Tyg. Lek.* 27(24):921-922, 1972.

3531 MALABSORPTION SYNDROME IN JEJUNAL DIVERTICULOSIS. *(Pol.)* Bochenek, W.;

Bem, Z.; Sosnik, H. (Wroslaw Med. Acad., Poland). *Pol. Tyg. Lek.* 27(29):1134-1136, 1972.

3532 USE OF MEDIUM-CHAIN TRIGLYCERIDES IN THE TREATMENT OF A PATIENT WITH INTESTINAL LYMPHANGECTASIA AND PROTEIN-LOSING ENTEROPATHY. *(Pol.)* Foltyn, H.; Korzon, M. (Acad. Med., Gdansk, Poland). *Pol. Tyg. Lek.* 27(33):1283-1284, 1972.

3533 COELIAC DISEASE AND SMALL BOWEL CARCINOMA. *(E.)* Kenwright, S. (Frenchay Hosp., Bristol, England). *Postgrad. Med. J.* 48(565):673-677, 1972.

3534 A NEW LOOK AT MALABSORPTION. *(E.)* Creamer, B. (St. Thomas' Hosp., London, England). *Rendic. Gastroenterol.* 4(2):103-107, 1972.

3535 INTESTINAL MUSCULAR LAYER ABLATION IN SHORT-BOWEL SYNDROME. *(E.)* Hidalgo, F.; Lopez Cortes, M.; Salas, S. J.; Zavala, J. (Gen. Hosp., Natl. Med. Ctr., Mexico City). *Arch. Surg.* 106(2):188-190, 1973.

3536 KWASHIORKOR AND INTELLECTUAL DEVELOPMENT. *(E.)* Evans, D. F.; Moodie, A. D.; Hansen, J. D. L. (Dept. Pediatr., Univ. Cape Town, South Africa). *S. Afr. Med. J.* 45(49):1413-1426, 1971.

3537 KWASHIORKOR: A PROSPECTIVE TEN-YEAR FOLLOW-UP STUDY. *(E.)* Keet, M. P.; Moodie, A. D.; Wittmann, W.; Hansen, J. D. L. (Dept. Pediatr., Univ. Cape Town, South Africa). *S. Afr. Med. J.* 45(49):1427-1449, 1971.

3538 THE SIGNIFICANCE OF INTESTINAL LACTASE IN MILK INTOLERANCE IN PATIENTS WITH STOMACH RESECTIONS. *(Ger.)* Diwok, K.; Hutter, H. J. (Med. Clin., Univ. Rostock, Germany). *Z. Gesamte Inn. Med.* 27(9):387-390, 1972.

3539 DISACCHARIDASE DEFICIENCY IN ADULTS WITH GASTROINTESTINAL DISEASES. *(Ger.)* Taschev, T.; Nedkowa-Bratanowa, N.; Nikolov, N.; Iwanov, E.; Sawow, G.; Kristewa, A. (Inst. Postgrad. Med., Sofia, Bulgaria). *Z. Gesamte Inn. Med.* 27(14):619-624, 1972.

See also 2989, 3261, 3278, 3366, 3432, 3433, 3434, 3441, 3442, 3470, 3486, 3686, 3642, 3807, 3867.

LARGE INTESTINE

3540 TUMOR-ASSOCIATED ANTIGEN IN PATIENTS WITH CARCINOMA OF THE COLON. *(E.)* LoGerfo, P.; LoGerfo, F.; Herter, F.; Barker, H. G.; Hansen, H. J. (Dept. Surg., Columbia Univ., New York). *Am. J. Surg.* 123(2):127-131, 1973.

Plasma from patients with carcinoma of the colon was analyzed for tumor-associated antigen (TAA) using a radioimmunoassay procedure. In 136 patients with carcinoma of the colon 7 of 19 with Dukes' A lesions, 14 of 23 with Dukes' B lesions, and 21 of 28 with Dukes' C lesions had circulating antigen. In 55 patients with metastatic disease 47 had elevated levels of antigen. Of 33 patients with benign polyps, 3 had elevated levels of antigen. A postoperative fall in the TAA level suggests that eradication of the disease has been achieved.

3541 CARCINOMA OF LARGE INTESTINE IN PATIENTS IRRADIATED FOR CARCINOMA OF CERVIX AND UTERUS. *(E.)* Castro, E. B.; Rosen, P. P.; Quan, S. H. Q. (Memorial Hosp. Cancer Allied Dis., New York). *Cancer* 31(1):45-52, 1973.

An analysis was made of the findings on 26 women with carcinoma of colon and rectum following radiation therapy for cancers of the cervix and uterus. These women ranged in age from 47-86 yr with more than 60% over 60 yr old. The interval between irradiation and diagnosis of the second tumor varied from 5-30 yr. Large intestine tumors included colloid adenocarcinoma (10), colloid adenocarcinoma in a villous adenoma (3), adenocarcinoma (10), adenocarcinoma in a villous adenoma (1), and squamous carcinoma (2). Of the 26, 19 had carcinoma located in the rectosigmoid area, 3 in the cecum, 1 in the transverse colon, and 2 had squamous carcinoma of the anus. Despite lack of detailed information on radiation factors in half of the patients, circumstantial evidence from this study suggests that radiation therapy may have contributed to the development of colorectal adenocarcinoma in some of the patients. Findings supporting this conclusion are: localization of second tumor at site of radiotherapy; 58% of the patients had symptomatic and clinically documented chronic radiation proctocolitis at sites of subsequent tumor; 69% of the patients had post-irradiation interval of more than 10 yr; 58% of the patients had histologic proof radiation-related alterations in involved bowel segment; occurrence of a much higher than expected percentage (58%) of mucinous (colloid) adenocarcinoma in involved region, of which 92% had clinical and/or histologic evidence of radiation proctocolitis. The overall and determinate 5-yr survival in this series was 20% and 22%, resp. The clinician should be vigilant in the follow-up of these patients who are long-term survivors of radiation-treated carcinoma of cervix and uterus for late development of colorectal carcinoma.

3542 DISTRIBUTION OF HUMAN COLONIC LYMPHATICS IN NORMAL, HYPERPLASTIC, SMALL CARCINOMAS IN PEDUNCULATED ADENOMAS, WITH TWO CASE REPORTS. *(E.)* Fenoglio, C. M.; Kaye, G. I.; Lane, N. (Coll. Phys. Surg., Columbia Univ., New York). *Gastroenterology* 64(1):51-66, 1973.

Lymphatic metastasis from focal carcinoma in the head of pedunculated adenomas was observed in 2 patients, both of whom were 58-yr-old women. The one was examined for painful hemorrhoids when 2 polyps, 1 in the sigmoid and 1 in the descending colon, were found. The other patient was examined after an episode of rectal bleeding and a 3-cm pedunculated lesion was located in the midsigmoid. Prompted by these 2 cases, lymphatics were studied in the colonic mucosa in normal, hyperplastic, and adenomatous tissue utilizing light and electron microscopy. In all 3 tissues there is a lymphatic plexus associated with the muscularis mucosae, but there are no lymphatics above this level. This explains why lymphatic metastases from superficial intramucosal foci of carcinoma in adenomas do not occur. In lobules of adenomatous tissue, the total distance between the free surface and the muscularis mucosae may be considerably increased, and a focus of carcinoma in adenomatous tissue must at least reach the muscularis mucosae and its lymphatics in order to metastasize. This lack of lymphatics contrasts with the profusion of blood capillaries at the mucosal surface. This may be an example of a more general biological phenomenon since other sites also concerned with water and ion transport (renal glomerulus, gallbladder mucosa, choroid plexus, and ciliary body) lack lymphatics but exhibit a rich blood capillary network at their transporting surfaces.

3543 CLINDAMYCIN-ASSOCIATED COLITIS. *(E.)* Cohen, L. E.; McNeill, C. J.; Wells, R. F. (Brooke Gen. Hosp., Fort Sam Houston, Tex.). *J.A.M.A.* 223(12):1379-1380, 1973.

Severe diarrhea and abdominal cramping pain occurred in 2 patients (56-yr-old male and 73-yr-old female) while receiving p.o. clindamycin therapy and in a 22-yr-old female 6 weeks after cessation of the same drug. No prior history of gastrointestinal disorders was revealed. Despite cessation of the drug, diarrhea continued and rectal biopsies showed nonspecific inflammatory changes, noncontributory bacteriological studies, and a unique proctoscopic finding of elevated, cream-colored, plaque-like lesions superimposed on an erythematous mucosa which was either friable or edematous.

3544 SPONTANEOUS PERFORATION OF THE CAECUM FOLLOWING CAESAREAN SECTION. REPORT OF A CASE AND REVIEW OF THE LITERATURE. *(E.)* Kalund Jensen, H. (St. Joseph's Hosp., Copenhagen, Denmark). *Acta Obstet. Gynec. Scand.* 51(4):381-383, 1972.

3545 AMYLOIDOSIS OF THE COLON. *(E.)* Seliger, G. (New York Univ. Med. Ctr., N.Y.). *Am. J. Gastroenterol.* 58(6):641-648, 1972.

3546 VOLVULUS OF THE TRANSVERSE COLON ASSOCIATED WITH SUBMUCOSAL HAMARTOMAS. REPORT OF A CASE. *(E.)* Lapin, R.; Kane, A.; Lee, C. S.; Rifat, H. (Coney Island Hosp., Brooklyn, N.Y.). *Am. J. Gastroenterol.* 59(2):170-173, 1973.

3547 FIBROMATOSIS IN GARDNER'S SYNDROME. *(E.)* Penn, D.; Federman, Q.; Finkel, M. (Mt. Sinai Sch. Med., New York). *Am. J. Gastroenterol.* 59(2):174-181, 1973.

3548 SURGICAL TREATMENT OF CANCER OF THE COLON AND RECTUM. *(E.)* Lange, W. G. (Fac. Med., Univ. Buenos Aires, Argentina). *Am. J. Proctol.* 23(1):63-67, 1972.

3549 CARCINOMA OF THE LARGE BOWEL. *(E.)* Prakash, A.; Sharma, L. K.; Sharma, M. P.; Pandit, P. N. (All-India Inst. Med. Sci., New Delhi). *Am. J. Proctol.* 23(2):153-158, 1972.

3550 OBSTRUCTIVE TUBERCULAR LESIONS OF THE LARGE GUT. *(E.)* Sharma, G. C.; Kala, P. C.; Bhargava, U. (S.M.S. Med. Coll., Jaipur, India). *Am. J. Proctol.* 23(3):218-227, 1972.

3551 PREOPERATIVE RADIATION THERAPY IN CARCINOMA OF THE RECTUM. *(E.)* Hayes, M. A.; Kligerman, M. M.; Vidone, R. (Yale Univ. Sch. Med., New Haven, Conn.). *Am. J. Proctol.* 23(4):289-295, 1972.

3552 PROCTOLOGICAL CANCER DETECTION: REPORT OF A SURVEY ON 1000 ASYMPTOMATIC NEUROPSYCHIATRIC PATIENTS. *(E.)* Weiss, O. (VA Hosp., Lyons, N.J.). *Am. J. Proctol.* 23(4):296-310, 1972.

3553 CANCER OF THE RECTUM IN CALIFORNIA 1942-1969: THE CALIFORNIA TUMOR REGISTRY EXPERIENCE. *(E.)* Krain, L. S. (Univ. California Ctr. Health Sci., Los Angeles). *Am. J. Proctol.* 23(4):311-318, 1972.

3554 UNUSUAL NEOPLASMS INVOLVING THE COLON. *(E.)* Greenbaum, E. I. (Serra Mem. Hosp., Sun Valley, Calif.). *Am. J. Proctol.* 23(6):459-470, 1972.

3555 INDIVIDUALIZED PREDICTIVE INDEX FOR CANCER OF THE RECTUM AND COLON. *(E.)* Taylor, L. H. (no affil.). *Am. J. Proctol.* 23(6):471-478, 1972.

3556 LYMPHOSARCOMA OF THE COLON. *(E.)* Messinger, N. H.; Bobroff, L. M.; Beneventano, T. C. (Montefiore Hosp. Med. Ctr., Bronx, N.Y.). *Am. J. Roentgenol. Radium Ther. Nucl. Med.* 117(2):281-286 1973.

3557 GERIATRIC COLON CANCER. *(E.)* Calabrese, C. T.; Adam, Y. G.; Volk, H. (Albert Einstein Coll. Med., Bronx, N.Y.). *Am. J. Surg.* 125(2):181-184, 1973.

3558 ANORECTAL SUPPURATIVE DISEASE: A RETROSPECTIVE REVIEW. *(E.)* Lindell, T. D.; Fletcher, W. S.; Krippaehne, W. W. (Univ. Oregon Med. Sch., Portland). *Am. J. Surg.* 125(2): 189-194, 1973.

3559 IMPORTANCE OF EARLY DIAGNOSIS IN THE TREATMENT OF CARCINOMA OF THE COLON AND RECTUM. *(E.)* Hight, D.; Kjartannsson, S.; Barillas, A. E. (Mem. Hosp., Worcester, Mass.). *Am. J. Surg.* 125(3):304-307, 1973.

3560 NATURAL HISTORY OF DIVERTICULAR DISEASE OF THE COLON IN YOUNG PATIENTS. *(E.)* Eusebio, E. B.; Eisenberg, M. M. (Univ. Minnesota Sch. Med., Minneapolis). *Am. J. Surg.* 125(3): 308-311, 1973.

3561 CARCINOMA OF THE TRANSVERSE COLON. *(E.)* Paris, M.; Cohn, Jr., I. (Louisiana State Univ. Sch. Med., New Orleans). *Am. Surg.* 39(1): 15-19, 1973.

3562 PHYSIOLOGIC RESPONSES OF THE ANO-RECTAL SPHINCTERS IN CHILDREN WITH INCONTINENCE AND CONSTIPATION PROBLEMS. *(E.)* White, J. J.; Suzuki, H.; El Shafie, M.; Kumar, A. P. M.; Haller, Jr., J. A.; Schnaufer, L. (Johns Hopkins Univ. Sch. Med., Baltimore, Md.). *Am. Surg.* 39(2):95-100, 1973.

3563 CECAL NECROSIS AND PERFORATION WITH SYSTEMIC CHEMOTHERAPY. *(E.)* Kingry, R. L.; Hobson, II, R. W.; Muir, R. W. (Walter Reed Army Inst.. Res., Washington, D.C.). *Am. Surg.* 39(3):129-134, 1973.

3564 THE IMPORTANCE OF VENOUS THROMBOSIS IN ACUTE INTESTINAL INFARCTION. *(E.)* Vandamme, J. P.; Vandamme, J.; Maenhoudt, R.; Bonte, J.; van der Schueren, G. (Vesalius Inst., Louvain, Belgium). *Arch. Chir. Neerl.* 24(4): 341-352, 1972.

3565 DEFINITIVE SURGICAL MANAGEMENT OF HIRSCHSPRUNG'S DISEASE. *(E.)* SanFilippo, J. A.; Allen, J. E.; Jewett, T. C. (Children's Hosp., Buffalo, N.Y.). *Arch. Surg.* 105(2):245-248, 1972.

3566 COLOVESICAL FISTULA. *(E.)* Geier, Jr., G. R.; Ujiki, G. T.; Shields, T. W. (Northwestern Univ. Med. Sch., Chicago, Ill.). *Arch. Surg.* 105(2):347-351, 1972.

3567 COLITIS CYSTICA PROFUNDA: LOCALIZED, SEGMENTAL, AND DIFFUSE. *(E.)* Herman, A. H.; Nasbeth, D. C. (Boston VA Hosp., Mass.). *Arch. Surg.* 106(3):337-341, 1973.

3568 CANCER OF THE RECTUM: THE RESULTS OF RADICAL RESECTION AND THE SUGGESTED ROLE OF LESSER PROCEDURES IN SELECTED CASES. *(E.)* Stuart, M. (Repatriation Gen. Hosp., Sydney, Australia). *Aust. N.Z. J. Surg.* 42(2):151-155, 1972.

3569 ACQUIRED DIVERTICULA OF THE VERMIFORM APPENDIX. *(E.)* Cameron, C. T. M.; Craig, S. H. (New York Med. Coll., N.Y.). *Aust. N.Z. J. Surg.* 42(2):158-160, 1972.

3570 MEGACOLON, INCLUDING HIRSCHSPRUNG'S DISEASE. *(E.)* Todd, I. P. (St. Bartholomew's Hosp., London, England). *Br. J. Clin. Pract.* 26(12):569-570, 1972.

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3572 EMERGENCY HEMICOLECTOMY FOR PERFORATION OF THE COLON IN ASSOCIATION WITH CARCINOMA. *(E.)* Bose, S. M.; Sachdeva, H. S. (Postgrad. Inst. Med. Educ. Res., Chandigarh, India). *Aust. N.Z. J. Surg.* 42(2):156-158, 1972.

3573 REMOVAL OF POLYPS WITH FIBREOPTIC COLONOSCOPE: A NEW APPROACH TO COLONIC POLYPECTOMY. *(E.)* Williams, C.; Muto, T.; Rutter, K. R. P. (St. Mark's Hosp., London, England). *Br. Med. J.* 1(5851):451-452, 1973.

3574 OPERATIVE COLONOSCOPY. *(E.)* Espiner, H. J.; Salmon, P. R.; Teague, R. H.; Read, A. E. (Bristol. Roy. Infirm., England). *Br. Med. J.* 1(5851):453-454, 1973.

3575 COLORECTAL POLYPS. *(E.)* Turell, R. (Albert Einstein Coll. Med., New York). *CA* 23(2):91-93, 1973.

3576 CANCER OF THE COLON IN PATIENTS WITH ULCERATIVE COLITIS SINCE CHILDHOOD. *(E.)* Devroede, G. J.; Dockerty, M. B.; Sauer, W. G.; Jackman, R. J.; Stickler, G. B. (Mayo Clin., Rochester, Minn.). *Can. J. Surg.* 15(6):369-374, 1972.

3577 CANCER OF THE COLON AND RECTUM: COMPARISON OF THE RESULTS OF THREE GROUPS OF SURGEONS USING DIFFERENT TECHNIQUES. *(E.)* Peloquin, A. B. (Notre Dame Hosp., Montreal, Canada). *Can. J. Surg.* 16(1):28-34, 1973.

3578 A SURGEON LOOKS AT RADIOTHERAPY IN CANCER OF THE COLON AND RECTUM. *(E.)* Quan, S. H. Q. (Mem. Hosp. Cancer Allied Dis., New York). *Cancer* 31(1):1-5, 1973.

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3580 CARCINOMA OF THE COLON AND RECTUM: CIRCULATING MALIGNANT CELLS AND FIVE-YEAR SURVIVAL. *(E.)* Griffiths, J. D.; McKinna, . A.; Rowbotham, H. D.; Tsolakidis, P.; Salsbury, . J. (St. Bartholomew's Hosp., London, England). *ancer* 31(1):226-236, 1973.

581 NODULAR LYMPHOID HYPERPLASIA IN A DEFUNCTIONALIZED COLON. *(E.)* Shiff, . D.; Sheahan, D. G.; Schwartz, S. S. (Yale Univ. ch. Med., New Haven, Conn.). *Gastrointest. Endosc.* 9(3):144-145, 1973.

582 SOME OBSERVATIONS ON THE INTRINSIC NERVOUS MECHANISM IN HIRSCHSPRUNG'S ISEASE. *(E.)* Frigo, G. M.; Del Tacca, M.; ecchini, S.; Crema, A. (Fac. Med., Univ. Pavia, taly). *Gut* 14(1):35-40, 1973.

3583 ISCHAEMIC COLITIS AND ABDOMINO-PERINEAL EXCISION OF THE RECTUM. *(E.)* Thomas, M. L.; Wellwood, J. M. (St. Thomas' Hosp., London, England). *Gut* 14(1):64-67, 1973.

3584 ISCHEMIC BOWEL DISEASE: A PROBLEM IN DIFFERENTIAL DIAGNOSIS. *(E.)* Marshak, R. H.; Lindner, A. E. (Mt. Sinai Sch. Med., New York). *Hosp. Pract.* 6(12):125-134, 1971.

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3586 OFFICE TREATMENT OF RECTAL AND ANAL DISEASES. *(E.)* Rodkey, G. V. (Harvard Med. Sch., Boston, Mass.). *J.A.M.A.* 223(6):676-680, 1973.

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3588 COMMON ANORECTAL PROBLEMS: A GUIDE TO OFFICE TREATMENT. *(E.)* Swerdlow, D. B. (Mountainside Hosp., Montclair, N.J.). *J. Med. Soc. N.J.* 69(10):835-839, 1972.

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3590 SERUM FREE AMINO ACID CONCENTRATION IN PATIENTS WITH RECTAL CANCER BEFORE AND AFTER SURGERY. *(Rus.)* Aminev, A. M.; Eliseev, M. N.; Eliseeva, O. I. (D. I. Ul'ianov Med. Inst., Kuibyshev, USSR). *Kazan. Med. Zh.* (5):30-33, 1972.

3591 CECAL DIVERTICULA. *(Rus.)* Gazetov, B. M. (Central Inst. Postgrad. Med., Moscow, USSR). *Kazan. Med. Zh.* (6):59-61, 1972.

3592 EFFECT OF CHOLECYSTOKININ ON COLONIC MOTILITY AND SYMPTOMS IN PATIENTS WITH THE IRRITABLE-BOWEL SYNDROME. *(E.)* Harvey, R. F.; Read, A. E. (Dept. Med., Univ. Bristol., England). *Lancet* (7793):1-3, 1973.

3593 ACUTE APPENDICITIS IN WEST MALAYSIA. *(E.)* Bin Dato Salleh, H.; Balasegaram, M. (Gen. Hosp., Kuala Lumpur, Malaysia). *Med. J. Malaya* 27(1):43-47, 1972.

3594 MALIGNANCY IN A LONGSTANDING COLON POLYP. *(E.)* Monge, J. J. (Duluth Clin., Minn.). *Minn. Med.* 55(11):986-987; 990, 1972.

3595 POLYPECTOMY VIA THE FIBEROPTIC COLONOSCOPE: REMOVAL OF NEOPLASMS BEYOND THE REACH OF THE SIGMOIDOSCOPE. *(E.)* Wolff, W. I.; Shinya, H. (Beth Israel Med. Ctr., New York). *N. Engl. J. Med.* 288(7):329-332, 1973.

3596 HEPATIC METASTASES FROM RECTAL AND COLON CANCERS: TREATMENT BY INFUSION OF 5-FLUOROURACIL INTO UMBILICAL VEIN. *(E.)* Ariel, I. M. (Flower and Fifth Ave. Hosp., New York). *N. Y. State J. Med.* 72(21):2629-2632, 1972.

3597 RUPTURED APPENDICITIS: THREE CASE REPORTS OF AN UNUSUAL COMPLICATION. *(E.)* Meyer, J. H. (no affil.). *Ohio State Med. J.* 68(11):1019-1021, 1972.

3598 BARIUM PERITONITIS IN PERFORATION OF THE LARGE INTESTINE. *(Ger.)* Ritter, L.; Kun, M.; Lanyi, F. (Inst. Postgrad. Med., Budapest, Hungary). *Praxis* 61(34):1071-1075, 1972.

3599 NONOPERATIVE DIAGNOSIS OF HIRSCHSPRUNG'S DISEASE IN NEONATES. *(E.)* Suzuki, H.; White, J. J.; El Shafie, M.; Shaker, I. J.; Haller, Jr., J. A.; Schnaufer, L. (Johns Hopkins Univ. Sch. Med, Baltimore, Md.). *Pediatrics* 51(2):188-191, 1973.

3600 INTERNAL PROCIDENTIA OF THE RECTUM: TREATMENT AND RESULTS. *(E.)* Ihre, T. (St. Gorans Hosp., Stockholm, Sweden). *Scand. J. Gastroenterol.* 7(7):643-646, 1972.

3601 TOTAL ABDOMINAL COLECTOMY IN THE SURGICAL MANAGEMENT OF DIVERTICULAR DISEASE OF THE COLON: TWENTY YEARS' EXPERIENCE. *(E.)* Crowson, W. N.; McCaughan, Jr., J. J. (VA Hosp., Memphis, Tenn.). *South. Med. J.* 65(12):1443-1447, 1972.

3602 PROGNOSIS AND SURGICAL PATHOLOGY OF CARCINOMA OF THE COLON. *(E.)* Buckwalter, Jr., J. A.; Kent, T. H. (Univ. Iowa Coll. Med., Iowa City). *Surg. Gynecol. Obstet.* 136(3):465-472, 1973.

3603 SYMPTOMATIC HAEMORRHOIDS IN PORTAL HYPERTENSION. *(E.)* Trenti, A.; Casella, M. C.; Gioffre, L. (Inst. Surg. Pathol. II, Univ. Rome, Italy). *Surg. Italy* 1(4):287-291, 1971.

3604 THE APPENDICITIS MORTALITY IN THE GERMAN DEMOCRATIC REPUBLIC FROM AN EPIDEMIOLOGICAL VIEWPOINT. *(Ger.)* Dahm, I. (Acad. Postgrad. Med., Berlin, Germany). *Z. Aerztl. Fortbild.* 66(10):514-518, 1972.

See also 3277, 3279, 3282, 3284, 3311, 3313, 3394, 3434, 3438, 3440, 3443, 3451, 3452, 3459, 3468, 3472, 3473, 3474, 3488, 3497, 3612, 3840, 3857, 3861, 3867, 3903, 3906, 3907, 3914.

LARGE INTESTINE

Ulcerative Colitis

3605 A STUDY OF INTESTINAL FUNCTION AND MORPHOLOGY IN NONSPECIFIC ULCERATIVE COLITIS IN ACUTE PHASE AND REMISSION IN INDIA. *(E.)* Chakravarti, K. R.; Sehgal, A. K.; Chakravarti, R. N.; Chhuttani, P. N. (Postgrad. Inst. Med. Educ. Res., Chandigarh, India). *Am. J. Dig. Dis.* 18(3):191-198, 1973.

Small intestinal functions and villous morphology were studied in 32 patients (24 male and 8 female, aged 20-67 yr), with nonspecific ulcerative colitis; 22 were in acute phase and 10 in remission. In the acute phase, mild steatorrhea was detected in 7 of 22 cases; abnormal D-xylose excretion in 8 of 18; significant morphologic changes in intestinal mucosa in 6 of 17; and radiologically, a mild deficiency pattern was detected in 6 of 12 cases. Malabsorptive derangement observed in the acute phase disappeared during remission. No malabsorptive or structural derangement was detected in cases with long remission. No motility disturbances were detected in any case. Intestinal dysfunction and morphologic changes correlated well with the severity of the disease. Anemia did not seem to play any role in the genesis of malabsorption, and hypoproteinemia showed some correlation only with fecal fat excretion.

3606 ENTEROBACTERIAL COMMON ANTIGEN-INDUCED LYMPHOCYTE REACTIVITY IN INFLAMMATORY BOWEL DISEASE. *(E.)* Bull, D. M.; Ignaczak, T. F. (Boston City Hosp., Mass.). *Gastroenterology* 64(1):43-50, 1973.

The enterobacterial common antigen of Kunin was shown to possess an antigenic relationship to colon cell membranes, and patients with inflammatory bowel disease had elevated titers of humoral antibody to this antigen. The presence of cellular immunity to enterobacterial common antigen was sought by studying its ability to stimulate lymphocytes from patients with inflammatory bowel disease to produce migration-inhibition factor, an *in vitro* correlate of *in vivo* cellular immunity. Antigen-stimulated lymphocytes from 8 patients with ulcerative colitis showed marked migration-inhibition activity. Lymphocyte cultures from 8 patients with regional enteritis were activated to a lesser degree by this antigen. Culture supernatants from lymphocytes of 8 healthy volunteers or of patients with diverticulitis (3), acute gastritis (2), *Salmonella* gastroenteritis (1), viral gastroenteritis (1), and hepatocarcinoma (1) were inactive or minimally active. Cellular immunity to enterobacterial common antigen may be important in the initiation or perpetuation of inflammatory bowel disease.

3607 PRECANCER AND CARCINOMA IN CHRONIC ULCERATIVE COLITIS. A HISTOPATHOLOGICAL AND CLINICAL INVESTIGATION. *(E.)* Hulten, L.; Kewenter, J.; Ahren, C. (Dept. Surg., Univ. Gothenburg, Sweden). *Scand. J. Gastroenterol.* 7(7):663-669, 1972.

Patients (34 males and 26 females, aged 21-87 yr; mean 40 yr) with chronic ulcerative colitis and colorectal carcinomas have been studied. The morphological features of the tumors and colonic mucosa were examined in 27 cases. The carcinomas were fairly evenly distributed in the colon and rectum. There were 7 cases of multiple carcinomas. The long-term outcome of the total material was estimated. In 47% of the patients, colitis started before the age of 20; and in 70%, before 25 yr. When carcinoma developed at a young age, the prognosis was mostly unfavorable (5-year survival about 25%). The bad prognosis seems to be an expression of a specific tumor biology at that particular age rather than characteristic features of colitic carcinoma *per se*, since the histological features of the idiopathic colorectal carcinomas in patients at the same age are very similar to the colitic carcinomas. Precancerous mucosal changes could be demonstrated in all cases except one. Precancerous changes in a rectal biopsy seem to justify a prophylatic proctocolectomy, since these patients have a special risk of developing a colonic carcinoma.

3608 FLUORESCENT ANTI-COLON AND ORGAN-SPECIFIC ANTIBODIES IN ULCERATIVE COLITIS. *(E.)* Marcussen, H.; Nerup, J. (Gentofte Hosp., Hellerup, Denmark). *Scand. J. Gastroenterol.* 8(1):9-15, 1973.

Patients (86 females and 59 males) with ulcerative colitis were examined for occurrence of circulating antibodies against parts of colon epithelium by the indirect immunofluorescence technique. Antibodies were present in 20%, a difference significant from a control group of 91 normal persons, 23 patients with Crohn's disease (11 definite and 12 possible Crohn's disease), and 30 with different intestinal symptoms including irritable colon (15), unclassifiable diarrhea (10), diverticulosis of the colon (3), and salmonellosis (2). The occurrence of organ-related antibodies directed against thyroid, adrenal, and parietal cells, and of antinuclear factor was equal in ulcerative colitis patients and normal subjects. The examination was performed with colon from guenons *(Cercopithecus aethiops)* as antigen. A cross-reaction with colon from rat was present, indicating the organ-specific and species-nonspecific nature of the antigen.

3609 THE BIOLOGICAL AND CLINICAL CHARACTERISTICS OF ULCERATIVE COLITIS IN PATIENTS HOSPITALIZED IN ZAGREB. *(E.)* Breitenfeld, V.; Knezevic, S.; Beus, I.; Bezjak, B.; Kallai, L. (Med. Fac., Zagreb, Yugoslavia). *Acta Med. Iugosl.* 26:295-306, 1972.

3610 LYMPHOTOXIN IN NONSPECIFIC INFLAMMATORY BOWEL DISEASE LYMPHOCYTES. *(E.)* Shorter, R. G.; Huizenga, K. A.; Spencer, R. J.; Weedon, D. (Mayo Clin., Rochester, Minn.). *Am. J. Dig. Dis.* 18(2):79-84, 1973.

3611 ILEAL POUCH WITH ILEOSTOMY RATHER THAN ILEOSTOMY ALONE. *(E.)* Beahrs, O. H.; Adson, M. A. (Mayo Clin., Rochester, Minn.). *Am. J. Surg.* 125(2):154-158, 1973.

3612 REAPPRAISAL OF RECTUM-RETAINING OPERATIONS FOR ULCERATIVE AND GRANULOMATOUS COLITIS. *(E.)* Tompkins, R. K.; Weinstein, M. H.; Foroozan, P.; Marx, F. W.; Barker, W. F. (Dept. Surg., UCLA Coll. Med., Ctr. Health Sci., Los Angeles, Calif.). *Am. J. Surg.* 125(2):159-164, 1973.

3613 HYPERALIMENTATION AS PRIMARY THERAPY FOR INFLAMMATORY BOWEL DISEASE. *(E.)* Fischer, J. E.; Foster, G. S.; Abel, R. M.; Abbott, W. M.; Ryan, J. A. (Massachusetts Gen. Hosp., Boston). *Am. J. Surg.* 125(2):165-175, 1973.

3614 THE PROPHYLACTIC EFFECT OF SALAZOSULPHAPYRIDINE IN ULCERATIVE COLITIS DURING LONG-TERM TREATMENT: A DOUBLE-BLIND TRIAL ON PATIENTS ASYMPTOMATIC FOR ONE YEAR. *(E.)* Riis, P.; Anthonisen, P.; Wulff, H. R.; Folkenborg, O.; Bonnevie, O.; Binder, V. (Gentofte Univ. Hosp., Hellerup, Denmark). *Scand. J. Gastroenterol.* 8(1):71-74, 1973.

3615 INFLAMMATORY BOWEL DISEASE: THE MANAGEMENT OF ULCERATIVE COLITIS. *(E.)* Jones, R. F.; Spiro, H. M.; Gelfand, M. D.; Taft, D. A.; Walker, J. H. (no affil.). *Bull. Mason Clin.* 26(2):35-37;56, 1972.

3616 INFLAMMATORY COLON DISEASE IN ROCHESTER, MINNESOTA, 1935-1964. *(E.)* Sedlack, R. E.; Nobrega, F. T.; Kurland, L. T.; Sauer, W. G. (Mayo Clin., Rochester, Minn.). *Gastroenterology* 62(5):935-941, 1972.

3617 ACUTE PERICHOLANGITIS AS THE INITIAL MANIFESTATION OF FULMINANT ULCERATIVE COLITIS. *(E.)* Slavin, S.; Keynan, A. (Hadassah Univ. Hosp., Jerusalem, Israel). *Isr. J. Med. Sci.* 8(10):1716-1720, 1973.

3618 RECTAL BIOPSY IN INFLAMMATORY BOWEL DISEASE. *(E.)* Morson, B. C.; (St. Mark's Hosp., London, England). *N. Engl. J. Med.* 287(26):1337-1339, 1972.

3619 SERUM IMMUNOGLOBULINS IN THE ULCERATIVE COLITIS. *(E.)* Radu, D.; Dejica, D. (Inst. Public Health Med. Res., Cluj, Rumania). *Rev. Roum. Biochim.* 9(4):321-325, 1972.

See also 3232, 3311, 3484, 3490, 3494, 3576.

PANCREAS

3620 DETERMINATION OF α-AMYLASE IN SERUM AND URINE OF SUBJECTS WITH A LOW BICARBONATE CONCENTRATION IN THE DUODENAL ASPIRATE AFTER SECRETIN STIMULATION. *(E.)* Adlercreutz, H.; Salmi, H. J.; Soininen, K.; Harkonen, M. (Dept. Clin. Chem., Univ. Helsinki, Finland). *Clin. Chim. Acta* 43(2):187-193, 1973.

Serum α-amylase activities and urinary α-amylase excretion were compared in normal subjects and 23 patients with suspected pancreatic insufficiency who had duodenal aspirates with a maximal bicarbonate concentration of less than 70 mM/liter after secretin stimulation. Subjects had chronic pancreatitis (5), pancreatic carcinoma (2), postcholecystectomy diarrhea (2), malabsorption (2), diabetes mellitus (3), achylia gastrica (1), and cardiac insufficiency (1). Of these 23 patients, 12 had diarrhea, 21 had abdominal pain, 5 had vomiting. The α-amylase was measured with a new, accurate and sensitive chromogenic method. Both the mean serum α-amylase values and the urinary excretion of α-amylase during 2 hr after intake of 500 ml of water were low in the pathological series and differed very significantly from the values of the control groups. Amylase clearance was significantly decreased in the pathological series, but the total overlap of the results precludes the use of serum α-amylase measurements as a diagnostic aid in pancreatic insufficiency. In contrast, the values for urinary excretion of α-amylase showed little overlap in the 2 series of subjects (only one value in the pathological series was above the suggested normal lower limit). This simple test, which can be made without a specialized gastroenterology department, could serve as a valuable aid in the laboratory diagnosis of pancreatic insufficiency. The results also indicate that at least 72% of the normal urinary α-amylase found in the water-load test is of pancreatic origin.

3621 PANCREATIC FUNCTION IN PATIENTS WITH THE ZOLLINGER-ELLISON SYNDROME. OBSERVATIONS CONCERNING ACID-BICARBONATE SECRETION RATES. *(E.)* Dreiling, D. A.; Greenstein, A. (Mt. Sinai Sch. Med., New York). *Med. Chir. Dig.* 1(1):1-4, 1972.

The gastric and pancreatic secretory data of 10 patients with the Zollinger-Ellison syndrome have been compared with similar data obtained from 350 normal subjects, patients with alcoholic disease and associated pancreatitis (154), biliary tract disease associated with pancreatitis (76), gastric ulcer (22), duodenal ulcer (55), and hemochromatosis (18). The gastric hypersecretion in Zollinger-Ellison patients appeats associated with a pancreatic hypersecretion of fluid and bicarbonate both in the unstimulated state and following secretin administration. Data suggest the action of increased release of endogenous secretin in the duodenum upon a pancreatic ductular parenchymal mass which has been augmented, presumably by hyperplasia and hypertrophy, in an attempt by the organism to maintain duodenal homeostasis.

3622 EARLY DIAGNOSIS OF PANCREATIC CARCINOMA. *(Ger.)* Maurer, G. (Surg. Clin., Technical Univ., Munich, Germany). *Munch. Med. Wochenschr.* 114(20):961-963, 1972.

3623 REGIONAL RESECTION OF CANCER OF THE PANCREAS: A NEW SURGICAL APPROACH. *(E.)* Fortner, J. G. (Mem. Hosp. Cancer Allied Dis., New York). *Surgery* 73(2):307-320, 1973.

3624 MECONIUM ILEUS. *(E.)* Shariatzadeh, A. N.; Enderle, F. J.; Fitzgerald, J. F.; Klatte, E. C.; Jesseph, J. E. (James Whitcomb Riley Mem. Hosp. Children, Indianapolis, Ind.). *Surg. Gynecol. Obstet.* 136(2):234-236, 1973.

3625 CANCER OF THE PANCREAS IN PATIENTS WITH CHRONIC PANCREATITIS AND PANCREATIC FIBROSIS. (CLINICAL AND AUTOPSY OBSERVATIONS). *(Rus.)* Shul'tsev, G. P.; Patrina, V. G.; Popov, E. A. (Central Inst. Postgrad. Med., Moscow, USSR). *Ter. Arkh.* 44(7):58-64, 1972.

3626 PHYSIOLOGIC DEFICIENCY OF PANCREATIC AMYLASE IN INFANCY: A FACTOR IN IATROGENIC DIARRHEA. *(E.)* Lilibridge, C. B.; Townes, P. L. (Genesee Hosp., Rochester, N.Y.) *J. Pediatr.* 82(2):279-282, 1973.

3627 PANCREATIC AND DUODENAL TRAUMA IN CHILDREN. *(E.)* Stone, H. H. (Emory Univ. Sch. Med., Atlanta, Ga.). *J. Pediatr. Surg.* 7(6):670-675, 1972.

3628 SURGICAL GASTROINTESTINAL DISEASE IN PATIENTS WITH CYSTIC FIBROSIS OF THE PANCREAS. *(E.)* Blue, S. K.; Shaffner, L. D. (Bowman Gray Sch. Med., Winston-Salem, N.C.). *N. C. Med. J.* 32(5):169-184, 1971.

3629 IMMUNOPATHOLOGY OF THE PANCREAS. *(Sp.)* Acosta, J. M.; Rubio Galli, O. A. (Fernandez Hosp. Sch., Natl. Univ. Rosario, Grandero Baigorria, Santa Fe, Argentina). *Prensa Med. Argent.* 59(13):491-496, 1972.

3630 ANNULAR PANCREAS: MORPHOGENETIC AND CLINICAL CONSIDERATIONS WITH THE PRESENTATION OF ONE PERSONAL CASE. *(Sp.)* Suarez Garcia, A.; Lorente Martinez, A.; Copereiro Halli, J. I.; Fernandez Florez, W.; Fernandez de Lis, S. (Fac. Med., Madrid, Spain). *Rev. Clin. Esp.* 125(2):153-160, 1971.

3631 PITFALLS IN THE DIAGNOSIS OF JAUNDICE DUE TO CARCINOMA OF THE PANCREAS OR BILIARY TREE. *(E.)* Stern, R. B.; Knill-Jones, R. P.; Williams, R. (King's Coll. Hosp. Med. Sch., London, England). *Br. Med. J.* 1(5852):533-534, 1973.

3632 GASTROINTESTINAL MANIFESTATIONS OF CYSTIC FIBROSIS. *(E.)* Kopel, F. B. (Mt. Sinai Sch. Med., City Univ. New York, N.Y.). *Gastroenterology* 62(3):483-491, 1972.

3633 CONSERVATIVE SURGERY FOR PANCREATIC CANCER IN GERIATRIC PATIENTS. *(E.)* Ficarra, B. J. (Ficarra Fdn., Oyster Bay, Long Island, N.Y.) *J. Am. Geriatr. Soc.* 20(11):560-563, 1972.

3634 ETIOLOGY AND TREATMENT OF PANCREATIC DISEASE: MODERN CONCEPTS. *(E.)* Riccitelli, M. L. (Yale Univ. Sch. Med., New Haven, Conn.). *J. Am. Geriatr. Soc.* 21(3):121-128, 1973.

3635 CHYLOUS ASCITES AS A MANIFESTATION OF PANCREATIC CANCER. *(Fr.)* Fraisse, H.; Etaix, J. P.; Gauthier, A. (Bellevue Hosp. Ctr., St. Etienne, France). *J. Med. Lyon* (1231): 925-927, 1972.

3636 FACTORS INFLUENCING MORBIDITY AND MORTALITY IN PANCREATICODUODENECTOMY. *(E.)* Gilsdorf, R. B.; Spanos, P. (VA Hosp., Minneapolis, Minn.). *Ann. Surg.* 177(3):332-337, 1973.

3637 A NUCLEAR MAGNETIC RESONANCE STUDY OF SODIUM IN THE SALIVA OF PATIENTS WITH CYSTIC FIBROSIS OF THE PANCREAS. *(E.)* Martinez, D.; Silvidi, A. A. (Biophys. Lab., Kent State Univ., Kent, Ohio). *Arch. Biochem. Biophys.* 148(1):224-227, 1972.

3638 AMYLASE IN THE MANAGEMENT OF PANCREATIC TRAUMA. *(E.)* White, P. H.; Benfield, J. R. (Harbor Gen. Hosp., Torrance, Calif.). *Arch. Surg.* 105(2):158-163, 1972.

3639 CARCINOMA OF THE PANCREAS: THERAPEUTIC IMPLICATIONS. *(E.)* Najera, M. E.; White, III, R. R. (Scott and White Mem. Hosp., Temple, Tex.). *Arch. Surg.* 106(3):293-294, 1973.

3640 PANCREATIC PSEUDOCYSTS. *(Por.)* Castelfranchi, P. L.; Ceneviva, R.; Moderna, J. L. P. (Fac. Med. Ribeirao Preto, Univ. Sao Paulo, Brazil). *Arq. Gastroenterol.* 9(3):111-118, 1972.

3641 BLUNT PANCREATIC TRAUMA: REPORT OF SIXTEEN CASES. *(E.)* Thomasson, B.; Linna, M. I.; Viljanto, J.; Aho, A. J. (Dept. Pediatr. Surg. Univ. Turku, Finland). *Acta Chir. Scand.* 139(1):48-54, 1973.

3642 THE VALUE OF THE GELATIN INFUSION TEST IN THE DIAGNOSIS OF PANCREATIC EXOCRINE INSUFFICIENCY IN PATIENTS WITH BILLROTH II ANASTOMOSES. *(E.)* Toskes, P. P.; Cerda, J. J. (VA Hosp., Philadelphia, Pa.). *Am. J. Dig. Dis.* 18(2):147-150, 1973.

3643 SPONTANEOUS INTRAPERITONEAL RUPTURE OF THE PSEUDOPANCREATIC CYST. *(E.)* Grover, N. K.; Gulati, S. M.; Taneja, O. P. (Maulana Azad Med. Coll., New Delhi, India). *Am. J. Gastroenterol.* 59(1):67-72, 1973.

3644 PROGRESS IN THE SURGICAL TREATMENT OF PANCREATIC DISEASE. *(E.)* Smith, R. (St. George's Hosp., London, England). *Am. J. Surg.* 125(2):143-153, 1973.

3645 CANCER OF THE PANCREAS: THE VALUE OF RADICAL AND PALLIATIVE SURGERY. *(E.)* Richards, A. B.; Sosin, H. (Univ. Minnesota Hosp., Minneapolis). *Ann. Surg.* 177(3):325-331, 1973.

See also 3124, 3234, 3236, 3243, 3250, 3267, 3304, 3314, 3460, 3522, 3821, 3861, 3892.

PANCREAS

Pancreatitis

3646 TREATMENT OF EXPERIMENTAL ACUTE PANCREATITIS WITH 5-FLUOROURACIL (5-FU). *(E.)* Johnson, R. M.; Barone, R. M.; Newson, B. L.; Das Gupta, T. K.; Nyhus, L. M. (Abraham Lincoln Sch. Med., Chicago, Ill.). *Am. J. Surg.* 125(2): 211-222, 1973.

The effects of 5-fluorouracil on the pancreas were studied in 30 healthy rats. Male Sprague-Dawley rats given 5-fluorouracil (45 mg/kg/day i.p. for 3 days) were sacrificed at 3 days-11 weeks after the last dose. Examination revealed considerably enlarged acinar cells, loss of normal basophilia, and nucleus displacement toward the cell base. A change in RNA content was further evidenced by methyl green-pyronine staining; general cytoplasmic staining was also reduced. Zymogen granules increased in number throughout the cell. Lipase was dispersed throughout the cytoplasm, and its activity was much weaker than in normal cells. Mitochondria were rounded out and cristae fragmented into rounded or tubular structures. The basal region of the cell was occupied by large irregular cisternae. Marked inhibition of protein synthesis was noted. By 11 weeks after cessation of 5-fluorouracil, normal morphologic characteristics were observed. Acute pancreatitis was induced in 30 adult dogs by injection of trypsin, bile, and blood into the caudal pancreatic duct. Pancreatitis was left untreated in 10 dogs; 10 received i.v. supportive therapy of dextrose plus vitamins B and C, 1 g Keflin, and calcium. All 20 of these died within 24 hr. Supportive regimen plus i.v. 5-fluorouracil (15, 10, and 7 mg/kg resp. on the 1st-3rd days after pancreatitis induction, continuing at 5 mg/kg through the 7th day) was given to 10 dogs; 1 died on the 3rd day. Pancreatic tissue samples of the 9 surviving dogs 1 month after fluorouracil therapy were similar to 11-week rat tissue specimens, suggesting that the effects of fluorouracil in acute pancreatitis are temporary, and most cells return to normal in time.

3647 USE OF AN ELEMENTAL DIET IN THE TREATMENT OF COMPLICATED PANCREATITIS. *(E.)* Voitk, A.; Brown, R. A.; Echave, V.; McArdle, A. H.; Gurd, F. N.; Thompson, A. G. (Montreal Gen. Hosp., Canada). *Am. J. Surg.* 125(2):223-227, 1973.

An elemental diet (Flexical) was used as the sole source of nutrition in 6 patients (3 male, 3 female, aged 12-48 yr) with complicated pancreatitis. Etiology of the disease was alcohol in 2 cases and gallstones in the other 4, with 1 of the alcoholic cases also having cholelithiasis. The patients, unable to tolerate normal food and unsuitable for i.v. hyperalimentation, tolerated the elemental diet well with complete recovery in all but 1 case. The elemental diet is nutritionally complete and contains the optimal nitrogen to protein ratio of 1:250 for most efficient nitrogen utilization. Positive nitrogen balance, increase in RBC mass, weight gain, resolution of sepsis and ascites, and spontaneous closure of pancreatic fistulas were documented.

3648 ACUTE PANCREATITIS DURING PREGNANCY AND POSTPARTUM. *(Fr.)* Kohler, J. J.; Weill, J. P.; Dreyfus, J.; Winisdorfer, G.; Hollender, L. F. (Univ. Hosp. Ctr., Strasbourg, France). *Ann. Chir.* 26(11/12):633-638, 1972.

Case reports are presented for 3 women who developed acute pancreatitis after delivery. A 42-yr-old woman, who had signs of pre-eclampsia in the 6th month of pregnancy, underwent a cesarean section because of placenta praevia and developed symptoms of acute pancreatitis the next day. Laparotomy showed pancreatitis with pancreatic necrosis. After surgical treatment, enzymatic pericarditis developed but responded to antienzyme therapy. However, the patient died 10 days later of a second episode of pancreatitis. A 28-yr-old woman with a history of 2 pregnancies complicated by pre-eclampsia, developed pains in the left hemithorax 18 hr after a normal delivery. This was diagnosed as a pulmonary embolism, for which the patient was hospitalized 15 days, but she developed severe epigastric pain immediately after discharge and was readmitted. Laparotomy showed hemorrhagic edematous pancreatitis which was treated surgically. After 3 months symptoms of subacute pancreatitis persisted. A 23-yr-old woman developed pain in the right hypochondrium 3 months before delivery. Laparotomy revealed choledocholithiasis with edematous pancreatitis. At 2 months follow-up the patient had recovered completely.

3649 TRYPSIN-BINDING α-2-MACROGLOBULIN IN PATIENTS WITH ACUTE PANCREATITIS. *(E.)*

Adham, N. F.; Dyce, B.; Haverback, B. J. (Dept. Med., Univ. Southern California, Los Angeles). *Gastroenterology* 61(3):365-372, 1972.

The purpose of this study was to determine whether a significant difference in serum trypsin-binding activity exists in patients with acute pancreatitis when compared to controls. The serum trypsin-binding activity was determined in 20 control subjects and 12 patients with acute pancreatitis The mean value for the control group was 114 μg of trypsin bound/ml of serum and for the pancreatitis group 41 μg/ml. Analysis of serum macroglobulins revealed no significant difference between normal controls and pancreatitis subjects. The α-2-macroglobulin content of the sera was determined by an antibody-agar radial diffusion procedure employing a highly purified primary standard of α-2-macroglobulin. The mean value of the 12 normal subjects was 199, and of the 12 pancreatitis patients, 181. The decreased serum trypsin-binding in pancreatitis patients persisted, despite subsidence of the acute attack, and then gradually rose to normal levels. The fact that the serum trypsin binding activity in acute pancreatitis is markedly reduced with the level of α-2-macroglobulin being unchanged, indicates that in this disease a substance, likely an enzyme, considerably in excess of the normal, is bound to the α-2-macroglobulin.

3650 THREE-DIMENSIONAL RECONSTRUCTION OF THE PANCREATIC DUCTS IN CHRONIC PANCREATITIS. *(E.)*

Nakamura, K.; Sarles, H.; Payan, H. (Natl. Inst. Health Med. Res., Marseille, France). *Gastroenterology* 62(5):942-949, 1972.

A three-dimensional reconstruction of the pancreatic ducts has been made from the secondary branches of the main duct to the terminal acini. This has been carried out by cutting serial sections from surgical specimens of the pancreas from 10 patients with alcoholic chronic calcifying pancreatitis. Specimens were taken prior to pancreaticojejunostomy (5), from a pancreaticoduodenectomy (2), and after resection f the tail of the pancreas (3). Each of these 10 atients consumed more that 100 ml of absolute alcohol/day, had severe persistent upper abdominal pain nd weight loss. Of the 10, 3 were diabetic. pecimens were also taken from 2 patients with a mall carcinoma obstructing the main pancreatic uct, and 1 normal pancreas. The lesions of alcifying pancreatitis demonstrated by this method howed characteristically: (a) spotty distribution f the lesions which were related to the ducts; b) a frequent finding in the ducts of plugs of precipitated protein, which tended to evolve into calculi by deposition of calcium on their surface (these plugs rarely contained mucopolysaccharide); (c) all sizes of duct were involved and showed irregular dilation, loss of lining epithelium, encroachment of periductal connective tissue to form stenosis, pancreatic cysts, or complete disappearance of acini, and ducts in the territory drained by a blocked duct. In chronic pancreatitis secondary to an obstruction in the main pancreatic duct, the lesions are different in almost every respect from those described above.

3651 FATAL NECROTIZING PANCREATITIS AFTER PERORAL CHOLANGIOPANCREATOGRAPHY. *(E.)*

Ammann, R. W.; Deyhle, P.; Butikofer, E. (Dept. Med., Univ. Zurich, Switzerland). *Gastroenterology* 64(2):320-323, 1973.

The first reported case of hemorrhagic necrotizing pancreatitis occurring as a complication of peroral cholangiopancreatography involved a 34-yr-old man who had undergone cholecystectomy for chronic cholecystitis and cholelithiasis. At surgery he was found to have an inflammatory tumor mass in the head of the pancreas. One month later the patient began to have episodes of epigastric pain associated with low-grade fever, tachycardia, slight elevations of serum amylase and alkaline phosphatase activities, and a gradual increase in the erythrocyte sedimentation rate. A pancreatic pseudocyst was found on peroral cholangiopancreatography. Symptoms of acute pancreatitis developed 14 hr after this procedure had been performed. Laparotomy, performed 2 days later, disclosed hemorrhagic necrotizing pancreatitis with free perforation into the peritoneum of a large inflammatory tumor mass near the root of the mesentery. The peritoneal exudate contained *Escherichia coli*, Enterococci, and *Proteus*. Despite drainage of the exudate and antibiotic therapy, the patient died suddenly 5 days after laparotomy with a massive intraperitoneal and intraintestinal hemorrhage. In this case it seems likely that injection of contrast medium into the subacute inflammatory pancreatic process with pseudocyst caused an acute exacerbation. Spread of bacteria into the cyst or from the cyst into surrounding pancreatic tissue may have played a role.

3652 ACUTE PANCREATITIS: A COMPARATIVE STUDY. *(E.)*

Innes, A. J.; Fitchett, C. W. (Norfolk Gen. Hosp., Va.). *Va. Med. Mon.* 99(6): 617-621, 1972.

3653 A CASE OF ADRENOCORTICAL CANCER COMPLICATED BY DISSEMINATED PANCREATITIS. *(Pol.)*

Janukowicz-Lorenz, H.; Kowal-Gierczak, B.; Lorenz, J.; Wojnar, A. (Acad. Med., Wroclaw, Poland). *Wiad. Lek.* 25(17):1575-1578, 1972.

3654 PLEURAL EFFUSIONS IN ACUTE AND CHRONIC PANCREATITIS. *(Ger.)* Willroth, P. O. (Regional Pulmonary Clin., Schwerin-Lankow, Germany). *Z. Gesamte Inn. Med.* 27(12):527-531, 1972.

3655 SURGICAL TREATMENT OF PANCREATITIS. *(Ger.)* Bodner, E. (Surg. Clin., Univ. Innsbruck, Austria). *Wien. Med. Wochenschr.* 122(8/9):117-120, 1972.

3656 PLEURAL EFFUSION IN RELAPSING PANCREATITIS. *(E.)* Manns, J. J. (Dundee Roy. Infirm., Scotland). *Postgrad. Med. J.* 48(565):689-690, 1972.

3657 ACUTE EXPERIMENTAL PANCREATITIS. CHRONOLOGICAL AND HISTOLOGICAL STUDY. *(Sp.)* Figueroa, M. A.; Gandsas, M.; Mosto, A. (Dept. Surg. Univ. Buenos Aires, Argentina). *Prensa Med. Argent.* 59:501-505, 1972.

3658 HEMODUCTAL PANCREATITIS. *(E.)* Longmire, Jr., W. P.; Rose, III, A. S. (UCLA Sch. Med., Los Angeles, Calif.). *Surg. Gynecol. Obstet.* 136(2):246-250, 1973.

3659 LONG TERM FOLLOW-UP STUDY OF FIFTY PATIENTS WITH PANCREATICOJEJUNOSTOMY. *(E.)* White, T. T.; Keith, R. G. (Swedish Hosp., Seattle, Washington). *Surg. Gynecol. Obstet.* 136(3):353-358, 1973.

3660 THROMBOTIC THROMBOCYTOPENIC PURPURA AS A CAUSE OF PANCREATITIS: REPORT OF A CASE AND REVIEW OF THE LITERATURE. *(E.)* Olsen, H. (no affil.). *Am. J. Dig. Dis.* 18(3):236-246, 1973.

3661 TREATMENT OF ACUTE NECROTIC HEMORRHAGIC PANCREATITIS. *(Fr.)* Hollender, L. F.; Kohler, J. J.; Klein, A.; Gillet, A. (Univ. Hosp. Ctr., Strasbourg, France). *Ann. Chir.* 26(11/12):649-656, 1972.

3662 CHRONIC FAMILIAL CALCAREOUS PANCREATITIS. *(Fr.)* Pestel, M.; Lambert, C.; Estenne, B.; Estenne, M.; Godeau (St. Louis Hosp., Paris, France). *Ann. Med. Interne (Paris)* 123(5):481-486, 1972.

3663 CHRONIC PANCREATITIS AND CHYLOUS ASCITES. DISCUSSION OF ONE CASE. *(Fr.)* Blanchon, P.; Hivet, M.; Naudin, G.; Holler, A. (Bicetre Hosp., Kremlin-Bicetre, France). *Ann. Med. Interne (Paris)* 123(5):491-495, 1972.

3664 MUMPS PANCREATITIS WITHOUT PAROTITIS. *(E.)* Naficy, K.; Nategh, R.; Ghadimi, H. (Grad. Sch. Public Health, Univ. Teheran, Iran). *Br. Med. J.* 1(5852):529, 1973.

3665 ACUTE AND CHRONIC PANCREATITIS IN ROCHESTER, MINNESOTA, 1940 TO 1969. *(E.)* O'Sullivan, J. N.; Nobrega, F. T.; Morlock, C. G.; Brown, Jr., A. L.; Bartholomew, L. G. (Mayo Clin., Rochester, Minn.). *Gastroenterology* 62(3):373-379, 1972.

3666 ACUTE PANCREATITIS AS A COMPLICATION OF IMURAN THERAPY IN REGIONAL ENTERITIS. *(E.)* Nogueira, J. R.; Freedman, M. A. (Gen. Rose Mem. Hosp., Denver, Colo.). *Gastroenterology* 62(5):1040-1041, 1972.

3667 CHRONIC PANCREATITIS. *(Fr.)* Vachon, A. (no affil.). *J. Med. Lyon* (1231):937-947, 1972.

3668 PRIMARY CHRONIC PANCREATITIS AND SECONDARY PERIPHERAL CALCAREOUS PANCREATITIS. I. POSING THE PROBLEM. *(Fr.)* Mallet-Guy, P. (no affil.). *Lyon Chir.* 68(4):249-255, 1972.

3669 ACINAR AND ENZYMATIC, VASCULAR AND INFLAMMATORY, LYMPHATIC AND INTERSTITIAL FACTORS CAUSING THE ONSET OF ACUTE PANCREATIC NECROSIS. *(Fr.)* Papp, M. (Inst. Exp. Med., Hungarian Acad. Sci., Budapest). *Lyon Chir.* 68(4):260-264, 1972.

3670 DISTURBANCES OF GLYCOREGULATION IN CHRONIC PANCREATITIS. CHANGES AFTER SURGICAL TREATMENT. *(E.)* Patrassi, N.; Perrotta, G.; Mineo, T. C.; Carboni, M. (2nd Surg. Clin., Univ. Rome, Italy). *Surg. Italy* 1(4):317-323, 1971.

See also 3234, 3235, 3250, 3253, 3625, 3634, 3644.

571 AMINO ACID METABOLISM IN LACTIC ACIDOSIS.
(E.) Marliss, E. B.; Aoki, T. T.; Toews,
. G.; Felig, P.; Connon, J. J.; Kyner, J.;
uckabee, W. E.; Cahill, Jr., G. F. (Inst. Clin.
iochem., Geneva, Switzerland). *Am. J. Med.*
2(4):474-481, 1972.

ndividual plasma amino acid levels have been
etermined in 6 patients with severe lactic
cidosis. There were 2 females and 4 males,
ged 35-77 yr. Associated disorders included
iabetes (4), gastroenteritis (2), diarrhea (1),
emia (1), pneumonia (1), myocardial infarction
1), essential hypertension (1), and acute hemorrhagic
ncreatitis (1). A consistently distorted pattern
s observed whether the disorder was due to
ock or was of the idiopathic type. A 6-fold
evation in mean alanine concentration was
served, and a significant correlation was demon-
rated between alanine and pyruvate concentrations.
nce alanine is normally released from muscle
d stoichiometrically extracted by liver, normal
rmation of alanine from pyruvate is suggested
the findings. However, uptake and metabolism
alanine by isolated, perfused rat liver was
gnificantly inhibited by perfusate concentrations
lactate and pyruvate equivalent to those observed
the patients. Thus, the high levels of alanine
lactic acidosis are viewed a consistent with
rmal or increased peripheral release combined
th impaired hepatic disposal. The levels of
of the 19 amino acids measured were elevated.
the remaining 4, 3 were intermediates of the
ea cycle.

72 ASSOCIATION OF ANDROGENIC-ANABOLIC
STEROID THERAPY WITH DEVELOPMENT OF
PATOCELLULAR CARCINOMA. *(E.)* Johnson, F. L.;
rner, K. G.; Siegel, M.; Feagler, J. R.; Majerus,
W.; Hartmann, J. R.; Thomas, E. D. (Children's
thopedic Hosp. Med. Ctr., Seattle, Washington).
ncet 2(7790):1273-1276, 1972.

ur patients with aplastic anemia developed
patocellular carcinoma after long-term therapy
er 6 months duration) with C_{17}-alkylated
drogenic-anabolic steroids (2 were treated
h oxymetholone and 2 with methyltestosterone
rivatives). In one child there was clinical
idence of tumour regression when the androgen
stopped. There are now epidemiological,
nical, and experimental observations which
gest that an androgenic environment may cause
l damage or hyperplasia leading to subsequent
ignant transformation. With the widespread
nical application of androgenic-anabolic steroids,
ecially their use by athletes, further study
elucidate the precise relationship between
s class of drugs and hepatocellular carcinoma
urged.

3 DIAGNOSIS AND DIFFERENTIAL DIAGNOSIS OF
HEPATOCEREBRAL DEGENERATION (WESTPHAL-
UMPELL-WILSON DISEASE). *(Ger.)* Bachman, H.; Biesold, D.; Eichner, B.; Gunther, K.; Lossner, J.; Weise, H.; Willgerodt, H. (Neurol. Clin., Karl Marx Univ., Leipzig, Germany). *Z. Aerztl. Fortbild.* 66(13):670-674, 1972.

A table summarizes symptoms found in 25 children (12 males and 13 females) with hepatolenticular degeneration. Except for 2 patients who were diagnosed at autopsy, all patients had reduced total serum copper and ceruloplasmin levels. The diagnosis was confirmed by the radioactive copper test in 20 of these 25 patients. The most common early symptoms were mental distrubances (10 cases), neurological disorders (8), and jaundice (8). In some patients these symptoms occurred in combination. Retrospectively, infectious hepatitis could not be ruled out in all children who developed jaundice: 2 had a history of cirrhosis and another had a 5-hr history of hemolytic anemia with neurological manifestations. Other symptoms included acute abdomen without jaundice (5 cases), tremor (2), dysarthria (2), skin symptoms (1), and musculoskeletal disorders (2). Cirrhosis was diagnosed by laparoscopy and liver biopsy in 10 children with manifest hepatolenticular degeneration, a neurologically asymptomatic patient, and in 5 patients who died and were autopsied. Kayer-Fleischer rings were observed in 17 patients, including 2 who were neurologically asymptomatic; 1 patient had chalcosis lentis and another had a less well-developed cataract.

3674 LIVER ABSCESS IN NEWBORN. COMPLICATION OF UMBILICAL VEIN CATHETERIZATION. *(E.)* Williams, J. W.; Rittenberry, A.; Dillard, R.; Allen, R. G. (Univ. Tennessee Coll. Med., Memphis). *Am. J. Dis. Child.* 125(1):111-113, 1973.

3675 THE LIVER IN PSORIASIS. *(E.)* Meltzer, S. S. (USAF Hosp., Homestead AFB, Fla.). *Am. J. Gastroenterol.* 58(5):491-492, 1972.

3676 PRIMARY CARCINOMA OF THE LIVER. A STUDY OF 39 CASES. *(E.)* Bhansali, S. K.; Deshpande, C. K. (Topiwala Natl. Med. Coll., Bombay, India). *Am. J. Gastroenterol.* 59(1): 54-66, 1973.

3677 PORTAL HYPERTENSION DUE TO HEPATIC SARCOIDOSIS. *(E.)* Berger, I.; Katz, M. (Flower and Fifth Ave. Hosp., New York, N.Y.). *Am. J. Gastroenterol.* 59(2):147-151, 1973.

3678 SEXUAL PRECOCITY ATTRIBUTABLE TO ETOPIC GONADOTROPIN SECRETION BY HEPATOBLASTOMA. *(E.)* McArthur, J. W.; Toll, G. D.; Russfield, A. B.; Reiss, A. M.; Quinby, W. C.; Baker, W. H. (Massachusetts Gen. Hosp., Boston). *Am. J. Med.* 54(3): 390-403, 1973.

3679 PORTAL HYPERTENSION IN CHILDREN. *(E.)* Raffensperger, J. G.; Shkolnik, A. A.; Boggs, J. D.; Swenson, O. (Children's Mem. Hosp., Chicago, Ill.). *Arch. Surg.* 105(2):249-254, 1972.

3680 CANCER OF THE RIGHT LOBE OF THE LIVER. A VARIETY OF OPERATIVE PROCEDURES. *(E.)* McBride, C. M.; Wallace, S. (M. D. Anderson Hosp., Houston, Tex.). *Arch. Surg.* 105(2):289-296, 1972.

3681 CYSTIC DILATION OF INTRAHEPATIC BILE DUCTS. PRESENTING AS GRAM-NEGATIVE SEPTICEMIA. *(E.)* Zer, M.; Chaimoff, C.; Dintsman, M.; Glanz, I. (Beilinson Hosp., Petah Tiqva, Israel). *Arch. Surg.* 106(2):225-227, 1973.

3682 ANAEROBIC LIVER ABSCESS COMPLICATING RADIATION ENTERITIS. *(E.)* McLaughlin, P.; Meban, S.; Thompson, W. G. (Ottawa Civic Hosp., Ont., Canada). *Can. Med. Assoc. J.* 108(3):353-354, 1973.

3683 CHOLESTATIC JAUNDICE ASSOCIATED WITH PRIMARY AMYLOIDOSIS. *(E.)* Mir-Madjlessi, S. H.; Farmer, R. G.; Hawk, W. A., Jr. (Cleveland Clin., Ohio). *Cleve. Clin. Q.* 39(4):167-175, 1972.

3684 TOWARD AN ARTIFICIAL LIVER: IN VITRO REMOVAL OF UNBOUND AND PROTEIN-BOUND COMPOUNDS RELATED TO HEPATIC FAILURE. *(E.)* Willson, R. A.; Webster, K. H.; Hofmann, A. F.; Summerskill, W. H. J. (Mayo Clin., Rochester, Minn.). *Gastroenterology* 62(6):1191-1199, 1972.

3685 THE CURRENT STATUS OF LIVER TRANSPLANTATION. *(E.)* Starzl, T. E. (Univ. Colorado, Med. Sch., Denver). *Hosp. Pract.* 6(3):47-60, 1971.

3686 REACTIVITY OF SERA FROM PATIENTS WITH RENAL AND LIVER DISEASES WITH MEMBRANE ANTIGENS ON MONKEY KIDNEY CELLS. *(E.)* Sundqvist, K. G. (Karolinska Inst., Sch. of Med., Stockholm, Sweden). *Int. Arch. Allergy* 42(5):641-652, 1972.

3687 MIXED CRYOGLOBULINEMIA WITH A MONOCLONAL IgM COMPONENT, ASSOCIATED WITH CHRONIC LIVER DISEASE. *(E.)* Zlotnick, A.; Slavin, A.; Eliakim, M. (Hebrew Univ. Hadassah Med. Sch., Jerusalem, Israel). *Isr. J. Med. Sci.* 8(12): 1968-1979, 1972.

3688 STUDIES ON THE PREKALLIKREIN-BRADYKINOGEN SYSTEM IN LIVER DISEASE. *(E.)* Stewart, D.; Blendis, L. M.; Williams, R. (King's Coll. Hosp. Med. Sch., London, England). *J. Clin. Pathol.* 25(5):410-414, 1972.

3689 LIGHT AND ELECTRON MICROSCOPY OF GLOBULAR HYALINE INCLUSIONS IN LIVER CELLS. *(E.)* Underwood, J. C. E. (Dept. Pathol., Univ. of Sheffield, England). *J. Clin. Pathol.* 25(9): 821-826, 1972.

3690 THE SEA-BLUE HISTIOCYTE SYNDROME WITH HEPATIC PORPHYRIA AND INFECTIOUS MONONUCLEOSIS. *(E.)* Ghosh, M. L. (Dist. Gen. Hosp., Barnsley, Yorkshire, England). *J. Clin. Pathol.* 25(11):945-956, 1972.

3691 ORAL CONTRACEPTIVES AND LIVER FUNCTION. *(E.)* Hargreaves, T. (Area Pathol. Lab., Heavitree, Exeter, Devon, England). *J. Clin. Pathol.* suppl. 3:1-10, 1973.

3692 STUDIES IN PORPHYRIA. I. A DEFECT IN THE REDUCTIVE TRANSFORMATION OF NATURAL STEROID HORMONES IN THE HEREDITARY LIVER DISEASE, ACUTE INTERMITTENT PORPHYRIA. *(E.)* Kappas, A.; Bradlow, H. L.; Gillette, P. N.; Gallagher, T. F. (Rockefeller Univ., New York, N.Y.). *J. Exp. Med.* 136(5):1043-1053, 1972.

3693 ARTHROPATHY AND LIVER DISEASE. *(E.)* Whelton, M. J. (St. Finbarr's Hosp., Cork, Ireland). *J. Ir. Med. Assoc.* 65(18):456-460, 1972.

3694 SULFATED BILE ACID IN URINE OF PATIENTS WITH HEPATOBILIARY DISEASES. *(E.)* Makino, S.; Shinozaki, K.; Nakagawa, S. (Hokkaido Univ. Sch. Med., Sapporo, Japan). *Lipids* 8(1): 47-49, 1973.

3695 LEUKOCYTE AND LIVER GLUTAMINASE IN LYSINURIC PROTEIN INTOLERANCE. *(E.)* Simell, O.; Perheentupa, J.; Visakorpi, J. K. (Univ. Helsinki, Children's Hosp., Finland). *Pediatr. Res.* 6(11):797-801, 1972.

3696 ULTRASTRUCTURAL FEATURES OF LYMPHOCYTES AND HEPATOCYTES IN NIEMANN-PICK DISEASE. *(It.)* Cuccurullo, L.; Di Toro, R.; Stoppoloni, G. (Inst. Pathol. Anat., Univ. Naples, Italy). *Pediatria (Napoli)* 80(1):14-19, 1972.

3697 EFFECT OF EXTRACORPOREAL CIRCULATION ON LIVER FUNCTION. *(Pol.)* Bross, T. (Acad. Med., Wroclaw, Poland). *Pol. Tyg. Lek.* 27(33):1288-1290, 1972.

3698 THERAPEUTIC TRIALS WITH "ESSENTIAL" PHOSPHOLIPIDS IN VARIOUS LIVER DISEASES. *(Sp.)* Alcala-Santaella, R.; Fernandez-Pacheco, A.; Garcia Garcia, F. J.; Alvarez Fernandez, E.

(no affil.). *Rev. Esp. Enferm. Apar. Dig.* 38(2): 247-260, 1972.

3699 THE IMPORTANCE OF PROTEIN MALNUTRITION IN THE GENESIS OF BANTU SIDEROSIS. *(E.)* Buchanan, W. M. (Stobhill Gen. Hosp., Glasgow, Scotland). *S. Afr. J. Med. Sci.* 36(4):99-106, 1971.

See also 3124, 3169, 3183, 3237, 3239, 3240, 3244, 3247, 3248, 3255, 3256, 3257, 3258, 3259, 3263, 3265, 3286, 3287, 3289, 3298, 3300, 3301, 3302, 3303, 3305, 3307, 3377, 3509, 3596, 3767, 3780, 3784, 3795, 3797, 3805, 3820, 3892, 3910, 3911, 3912, 3915, 3916, 3920, 3921.

3700 PLASMA ENZYME ACTIVITIES AFTER STANDARIZED PHYSICAL ACTIVITY IN PATIENTS WITH LIVER DISEASES. *(Ger.)* Linneke, P.; Hoffmann, H.; Ehrke, D.; Lazarus, P. (Schwerin Regional Hosp., Germany). *Z. Gesamte Inn. Med.* 28(1):11-14, 1973.

LIVER AND BILIARY TRACT

Hyperbilirubinemic States

3701 CONTROLLED TRIAL COMPARING AGAR, INTERMITTENT PHOTOTHERAPY, AND CONTINUOUS PHOTOTHERAPY FOR REDUCING NEONATAL HYPERBILIRUBINEMIA. *(E.)* Maurer, H. M.; Shumway, C. N.; Draper, D. A.; Hossaini, A. A. (Med. Coll. Virginia, Richmond). *J. Pediatr.* 80(1):73-76, 1973.

Sixty-nine low-birth-weight infants, less than 24 hr old, were randomly assigned to 1 of 4 therapy groups: (1) agar, 125 mg p.o. every 3 hr for 4 days beginning at 18 hr; (2) exposure to blue light, 200 to 300 footcandles 12 hr/day for 4 days (intermittent light); (3) exposure to blue light continuously for 4 days (continuous light); and (4) no therapy. Infants with a positive Coombs test or sepsis were excluded. Of the 69 infants, more than 90% were Negro. From the second day on, infants who received light continuously had significantly lower mean bilirubin concentrations than any of the other 3 groups. Infants who received intermittent light or agar had daily mean values which were not significantly different from those of the control subjects except on day 4. Side effects were minimal, consisting of occasional mild diarrhea. Continuous phototherapy is strongly recommended for low-birth-weight infants with serum bilirubin concentration of at least 10 mg/100 ml.

3702 RADIOACTIVE ROSE BENGAL TEST IN THE DIFFERENTIAL DIAGNOSIS OF JAUNDICE. *(E.)* Olsson, R.; Bjurstam, N. (Sahlgren Hosp., Goteborg, Sweden). *Surg. Gynecol. Obstet.* 136(2):273-274, 1973.

3703 USE OF SEQUENTIAL BAYESIAN MODEL IN DIAGNOSIS OF JAUNDICE BY COMPUTER. *(E.)* Knill-Jones, R. P.; Stern, R. B.; Girmes, D. H.; Maxwell, J. D.; Thompson, R. P. H.; Williams, R. (Univ. Glasgow, Scotland). *Br. Med. J.* 1(5852): 530-533, 1973.

3704 EFFECT OF INHIBITORS OF PROTEIN AND RIBONUCLEIC ACID SYNTHESIS ON THE HYPERBILIRUBINEMIA AND CHOLESTASIS PRODUCED BY α-NAPHTHYLISOTHIOCYANATE. *(E.)* Indacochea-Redmond, N.; Witschi, N.; Plaa, G. L. (Fac. Med., Univ. Montreal, Canada). *J. Pharmacol. Exp. Ther.* 184(3):780-786, 1973.

3705 HEPATIC TRAUMA. *(E.)* Mays, E. T. (Univ. Louisville Sch. Med., Health Sci. Ctr., Ky.). *N. Engl. J. Med.* 288(8):402-405, 1973.

3706 JAUNDICE WITH DUBIN-JOHNSON-SPRINZ SYNDROME PRECIPITATED BY ORAL CONTRACEPTIVES. *(E.)* Schinella, R. A. (New York Univ. Med. Ctr., N.Y.). *N.Y. State J. Med.* 72(22):2810-2813, 1972.

See also 3285, 3617.

LIVER AND BILIARY TRACT

Acute Nonviral Hepatitis and Hepatic Injury

3707 CARBENOXOLONE AS A POSSIBLE CAUSE OF LIVER DAMAGE. *(Ger.)* Laubenthal, F. (St. Josef Hosp. Essen-Kupferdreh, Germany). *Dtsch. Med. Wochenschr.* 97(36):1351-1354, 1972.

Liver function tests (SGOT, SGPT, and in some cases LDH, alkaline phosphatase, and BSP retention) became pathological 8-35 days after institution of carbenoxolone therapy for peptic ulcer in 5 patients. None of these patients had a history of liver disease, alcoholism, or any other serious disease involving the liver, and only 1 was receiving other medication.

None of the patients became jaundiced, had elevated serum bilirubin levels, or showed histological abnormalities on liver biopsy. One patient developed subclinical diabetes. All liver function tests returned to normal within 5-35 days after discontinuation of carbenoxolone. To prevent permanent liver damage, care should be taken in administering carbenoxolone, particularly since the therapeutic results were not significantly better than those obtained by conventional means (antacids, anticholinergics, etc

3708 BACTEROIDES LIVER ABSCESS. *(E.)* Futch, C.; Zikria, B. A.; Neu, H. C. (Coll. Phys. Surg., Columbia Univ., New York, N.Y.). *Surgery* 73(1):59-65, 1973.

Case reports are presented for 5 patients (4 males and 1 female aged 25-65 yr) with *Bacteroides fragilis* liver abscess. Although the clinical presentation of *Bacteroides* liver abscess is similar to that of other pyogenic liver abscesses, the tissue involvement may be different. In both diagnosis and localization of liver abscesses, hepatic photoscanning has been a helpful adjunct. *Bacteroides* should be suspected at operation because of the foul odor of abscess material and the ill-defined wall of the abscess. *Bacteroides* should be particularly suspected in a patient who develops a liver abscess as a complication of an abdominal surgery, since commonly used antibiotics will not act on *Bacteroides*.

3709 CHOLESTATIC LIVER DISEASE INDUCED BY DIPHENYLHYDANTOIN. *(Ger.)* Martin, W.; Rickers, J. (Med. Clin., Univ. Hamburg, Germany). *Wien. Klin. Wochenschr.* 84(3):41-43, 1972.

A 30-yr-old man, given diphenylhydantoin (0.3 g/day) for 7 weeks to control jacksonian epilepsy caused by an inoperable brain tumor, developed a fever of more than 40°C, a hemorrhagic morbilliform exanthema, clay-colored stools, and dark urine. These were accompanied by jaundice, moderate hepatosplenomegaly, and a generalized lymphadenopathy with increased serum alkaline phosphatase, transaminase, LDH, and hydroxybutyryl dehydrogenase levels and a biliribin of 7.6 mg/100 ml. A diagnosis of infectious mononucleosis associated with hepatitis was revised to a generalized allergic reaction to diphenylihydantoin, because serological tests were negative. Transitory hematemesis and melena resulted from a hepatogenic coagulopathy, and the patient began to go into an hepatic coma. Despite administration of large doses of prednisolone, the fever lasted 2 weeks. Improvement in the patient's general condition was accompanied by an increase in the eosinophil count and an increase in serum alkaline phosphatase with the morbilitiform exanthema becoming an exfoliative dermatitis. A skin test for allergy was negative, probably because of continued corticosteroid therapy. A liver biopsy revealed many bile cylinders, primarily in the centrilobular region, and deposits of bile pigment in the hepatocytes. No evidence of increased periportal connective tissue, destruction of lamellae, or pathological deposition of iron pigment was found. This cholestatic liver disease was completely reversible, as evidence by serum enzyme levels and liver biopsy, after discontinuation of diphenylhydantoin.

3710 HEPATIC MANIFESTATIONS IN BACTERIAL INFECTIONS OF INFANTS AND CHILDREN. CLINICAL FEATURES, BIOCHEMICAL DATA AND MORPHOLOGIC HEPATIC CHANGES (HISTOLOGICAL AND ULTRASTRUCTURAL). *(E.)* Borges, M. A. G.; de Brito, T.; Borges, J. M. G. (Clin. Hosp., Univ. Sao Paulo, Brazil). *Acta Hepatogastroenterol.* 19(5):328-344, 1972.

3711 HEPATIC ACTINOMYCOSIS. *(Ger.)* Beck, O. A. (Pathol. Inst., Free Univ. Berlin, Germany). *Acta Hepatogastroenterol.* 19(6):430-439, 1972.

3712 METHYLDOPA HEPATITIS: REPORT OF THREE CASES. *(E.)* Hoyumpa, Jr., A. M.; Connell, A. M. (Univ. Cincinnati Coll. Med., Ohio). *Am. J. Dig. Dis.* 18(3):213-222, 1973.

3713 GRANULOMATOUS HEPATITIS: THE USEFULNESS OF LIVER BIOPSY IN THE DIAGNOSIS OF TUBERCULOSIS AND SARCOIDOSIS. *(E.)* Alexander, J. F.; Galambos, J. T. (Emory Univ. Sch. Med., Atlanta, Ga.). *Am. J. Gastroenterol.* 59(1):23-30, 1973.

3714 THE LIVER IN TYPHOID FEVER. *(E.)* Ayhan, A.; Gokoz, A.; Karacadag, S.; Telatar, H. (Hacettepe Univ. Med. Ctr., Ankara, Turkey). *Am. J. Gastroenterol.* 59(2):141-146, 1973.

3715 HISTOCHEMICAL FINDINGS ON RAT LIVER ENZYMES AFTER GALACTOSAMINE DAMAGE AND CHOLINE OROTATE. *(Ger.)* Petzold, H.; Neupert, A. (Med. Clin., Karl Marx Univ., Leipzig, Germany). *Z. Gesamte Inn. Med.* 27(249):1087-1090, 1972.

3716 RIFAMPICIN: STUDY OF ITS ANTITUBERCULOSIS ACTIVITY AND ITS LIVER TOXICITY IN 200 PATIENTS. *(Fr.)* Macquet, V.; Lafitte, P.; Rogeaux, Y. (Hosp. Ctr., Tourcoing, France). *Lille Med.* 17(5):755-761, 1972.

3717 RADIATION HEPATITIS INDUCED BY ABDOMINAL IRRADIATION WITH THE COBALT 60 MOVING STRIP TECHNIQUE. *(E.)* Wharton, J. T.; Delclos, L.; Gallager, S.; Smith, J. P. (Univ. Texas M. D. Anderson Hosp. Tumor Inst., Houston). *Am. J. Roentgenol. Radium Ther. Nucl. Med.* 117(1):73-80, 1973.

3718 ISONIAZID AND THE LIVER. *(E.)* Meade, G. M. (Ctr. Dis. Control. Atlanta, Ga.). *Clin. Pediatr.* 11(9):498, 1972.

3719 LIVER DAMAGE CAUSED BY LAXATIVES. *(Ger.)* Wildhirt, E. (Munic. Hosp., Kassel, Germany). *Dtsch. Med. Wochenschr.* 97(32):1181-1182, 1972.

3720 DISSEMINATED INTRAVASCULAR COAGULATION IN LIVER DAMAGE CAUSED BY AMANITA PHALLOIDES POISONING. *(Ger.)* Brunswig, D.; Liehr, H.; Richter, E. (Med. Clin., Univ. Wurzburg, Germany). *Dtsch. Med. Wochenschr.* 97(36):1347-1351, 1972.

3721 MICROSCOPIC PATHOLOGY OF THE LIVER IN LEPROSY PATIENTS. *(E.)* Sehgal, V. N.; Tyagi, S. P.; Kumar, S.; Gupta, M. C.; Hameed, S. (Goa Med. Coll., Panaji, Goa, India). *Int. J. Dermatol.* 11(3):168-172, 1972.

3722 HEPATOTOXICITY DUE TO METHYLPHENIDATE HYDROCHLORIDE. *(E.)* Goodman, C. R. (State Univ. New York Downstate Med. Ctr., Brooklyn). *N.Y. State J. Med.* 72(18):2339-2340, 1972.

3723 TERTIARY SYPHILIS OF THE LIVER: CASE REPORT. *(E.)* Islam, N.; Wadud, A. (Inst. Postgrad. Med., Dacca, Bangladesh). *J. Trop. Med. Hyg.* 75(9):183-186, 1972.

3724 FAILURE TO DEMONSTRATE TRANSFORMATION OF LYMPHOCYTES OF PATIENTS WITH ISONIAZID-ASSOCIATED HEPATITIS. *(E.)* Dove, J. T.; Chaparas, S. D.; Hedrick, S. R. (Tuberculosis Br., Ctr. Dis. Control., Rockville, Md.). *Am. Rev. Resp. Dis.* 106:485-487, 1972.

3725 DIPHENYL POISONING IN FRUIT PAPER PRODUCTION: A NEW HEALTH HAZARD. *(E.)* Hakkinen, I.; Siltanen, E.; Hernberg, S.; Seppalainen, A. M.; Karli, P.; Vikkula, E. (Inst. Occupational Health, Helsinki, Finland). *Arch. Environ. Health* 26(2):70-74, 1973.

3726 SALICYLATE HEPATOTOXICITY IN PATIENTS WITH JUVENILE RHEUMATOID ARTHRITIS. *(E.)* Rich, R. R.; Johnson, J. S. (Natl. Inst. Allergy Infectious Dis., Bethesda, Md.). *Arthritis Rheum.* 16(1):1-9, 1973.

3727 HALOTHANE HEPATITIS AS SEEN BY THE PHYSICIAN. *(E.)* Reed, W. D.; Williams, R. (King's Coll. Hosp. Med. Sch., London, England). *Br. J. Anaesth.* 44(9):935-937;940, 1972.

See also 3172, 3766.

LIVER AND BILIARY TRACT

Acute Viral Hepatitis

3728 RELATION BETWEEN AUSTRALIA ANTIGEN AND LIVER DISEASE. I. A FAMILY SURVEY FOR THE AUSTRALIA ANTIGEN POSITIVE CHRONIC HEPATITIS AND CIRRHOSIS OF THE LIVER. *(Jap.)* Miyagawa, T.; (Gifu Univ. Sch. Med., Japan). *Acta Sch. Med. Univ. Gifu* 20(3):396-414, 1972.

A study of Australia antigen was made in 82 subjects belonging to 8 families of patients with Australia-antigen-positive chronic hepatitis and cirrhosis. Australia antigen was detected in 34 (41.4%) of these 82 subjects. The incidence of this antigen was higher in females (48.8%) than in males, 33.3%). Australia antibody was also found in 1 male and 1 female. Liver function tests (serum proteins, SGOT, SGPT, thymol turbidity test, and others) were abnormal in 15 (44.1%) of the 34 subjects with Australia antigen. Maternal transmission of Australia antigen to children was frequent (88%) and independent of the sex of the child. This study also suggests that transmission may also occur from father to child or between siblings.

3729 NEW SPECIFICITIES IN AUSTRALIA ANTIGEN POSITIVE SERA DISTINCT FROM THE LE BOUVIER DETERMINANTS. *(E.)* Magnius, L. O.; Espmark, J. A. (State Bacteriol. Lab., Stockholm, Sweden). *J. Immunol.* 109(5):1017-1021, 1972.

Evidence for new antigenic specificities in Australia (Au) antigen-positive sera, for one of which is proposed the designation *e*, has been obtained in Ouchterlony immunodiffusion tests. These specificities co-occur with Au antigen and are distinct from the *a*, *d*, *y*, and *x* determinants of the Au antigen complex according to Le Bouvier and occur on particles other than those carrying the *a* determinant. The *e* determinant was found in 18 of 23 persistent carriers of Au antigen from hemodialysis units, in 6 of 43 Au-positive-hepatitis cases, but in none of 17 Au antigen-carrying blood donors. In the latter group, however, antibodies against the specificities described here occurred in 13 out of 17 individuals. In 5 of these cases the antibody was directed against the *e* specificity. There is a possible association of this antigen complex to contagiousness. In the 4 Australian antigen-negative control groups of 39 infectious hepatitis cases, 24 hemodialysis patients, 151 healthy blood donors, and 20 chronic active hepatitis patients, no antigens or antibodies were found.

3730 SEVERE VIRAL HEPATITIS: INTRAVASCULAR COAGULATION AND FIBRINOLYSIS. RADIOISOTOPE STUDY OF PLATELET LIFE AND FIBRINOGEN. *(Fr.)* Dechavanne, M.; Bouletreau, P.; Petit, P. (Herriot Hosp., Lyon, France). *Presse Med.* 79(54):2485-2486, 1971.

A kinetic study of fibrinogen destruction was made on 3 patients with severe viral hepatitis by using ^{125}I-labeled fibrinogen. Fibrinogen degradation, calculated daily from radioactivity in the urine, was increased in all 3 patients. The curve for radioactivity in the blood decreased very rapdily in 2 patients and with moderate rapidity in 1. This rapid disappearance of radioactivity from the blood could not be accounted for by abnormalities in fibrinogen distribution or by losses due to bleeding (none of the patients had hemorrhages during the time these tests were run). A simultaneous study with ^{51}Cr-labeled platelets was made to determine whether this increased fibrinogen catabolism was due to fibrinolysis or intravascular coagulation. In 1 patient daily platelet destruction was normal, and increased fibrinogen catabolism was caused by primary fibrinolysis. Moderately decreased platelet counts resulted from bone marrow insufficiency; this patient recovered completely. In the other 2 patients, however, platelet destruction was increased, probably because of intravascular coaglation due to contact with lysed cells. Alternatively, increased fibrinogen catabolism could be a manifestation of fibrinolysis, while platelet destruction could be caused by an autoimmune process. These 2 patients died of gastrointestinal bleeding and shock of unknown etiology. Thus, intravascular coagulation in viral hepatitis appears to have a poor prognosis.

3731 AUSTRALIA ANTIGEN AND ANTIBODY IN TRANSFUSED CHILDREN WITH THALASSAEMIA. *(E.)* Vierucci, A.; London, W. T.; Blumberg, B. S.; Sutnick, A. I.; Ragazzini, F. (Inst. Cancer Res., Fox Chase, Philadelphia, Pa.). *Arch. Dis. Child.* 47(255):760-762, 1972.

3732 NEONATAL HEPATITIS ASSOCIATED WITH AUSTRALIA ANTIGEN (Au-1). *(E.)* Kattamis, C.; Demetriou, D.; Karambula, K.; Davri-Karamouzi, Y.; Matsaniotis, N. (St. Sophie's Children's Hosp., Athens, Greece). *Arch. Dis. Child.* 48(2):133-136, 1973.

3733 HEPATITIS ANTIGEN AND α-FETOPROTEIN IN NEONATAL HEPATITIS. *(E.)* Chandra, R. K. (All India Inst. Med. Sci., New Delhi). *Arch. Dis. Child.* 48(2):157-158, 1973.

3734 ARTHRITIS AND VIRAL HEPATITIS: A PATIENT WITH TRANSIENT SERUM HEPATITIS-ASSOCIATED ANTIGEN, SKIN NODULES, RASH, AND LOW SERUM COMPLEMENT. *(E.)* Wenzel, R. P.; McCormick, D. P.; Busch, H. J.; Beam, Jr., W. E. (Naval Hosp., Camp Lejeune, N.C.). *Arch. Intern. Med.* 130(5):770-771, 1972.

3735 EARLY STUDIES OF VIRAL HEPATITIS. *(E.)* MacCallum, F. O. (Radcliffe Infirm., Oxford, England). *Br. Med. Bull.* 28(2):105-108, 1972.

3736 SPECTRUM OF VIRAL HEPATITIS. *(E.)* Danovitch, S. H. (Washington Hosp. Ctr., Washington, D.C.). *Am. Fam. Physician* 6(5):112-118, 1972.

3737 VIRAL HEPATITIS AND AGRANULOCYTOSIS. *(E.)* Nagaraju, M.; Weitzman, S.; Baumann, G. (Wayne County Gen. Hosp., Eloise, Mich.). *Am. J. Dig. Dis.* 18(3):247-252, 1973.

3738 IDENTIFICATION OF A TYPE B HEPATITIS EPIDEMIC IN COSTA RICA. COMPARATIVE ANALYSIS OF TWO OUTBREAKS OF VIRAL HEPATITIS. *(E.)* Villarejos, V. M.; Gutierrez, A.; Pelon, W. (Louisiana State Univ. Int. Ctr. Med. Res. Training, San Jose, Costa Rica). *Am. J. Epidemiol.* 96(5):372-378, 1972.

3739 INFECTIOUS HEPATITIS OUTBREAK WITH MAI TAI AS THE VEHICLE OF TRANSMISSION. *(E.)* Philp, J. R.; Hamilton, II, T. P.; Albert, T. J.; Stone, R. S.; Pait, C. F. (Orange County Health Dept., Santa Ana, Calif.). *Am. J. Epidemiol.* 97(1):50-54, 1973.

3740 LACK OF RELATIONSHIP BETWEEN DOWN'S SYNDROME AND MATERNAL EXPOSURE TO AUSTRALIA ANTIGEN. *(E.)* Dietzman, D. E.; Madden, D. L.; Sever, J. L.; Lander, J. J.; Purcell, R. H. (Natl. Inst. Neurol. Dis. Stroke, Bethesda, Md.). *Am. J. Dis. Child.* 124(2):195-197, 1972.

3741 THE COURSE OF LONG INCUBATION (VIRUS B) HEPATITIS. *(E.)* Sherlock, S. (Roy.

Free Hosp. Sch. Med., Univ. London, England). *Br. Med. Bull.* 28(2):109-113;114-119, 1972.

3742 PATHOLOGY OF VIRAL HEPATITIS. *(E.)* Weinbren, K.; Stirling, G. A. (Univ. Nottingham Med. Sch., England). *Br. Med. Bull.* 28(2):125-130, 1972.

3743 ANTIGEN IN INFECTIOUS HEPATITIS. *(E.)* Ferris, A. A. (Alfred Hosp., Prahran, Victoria, Australia). *Br. Med. Bull.* 28(2):131-133, 1972.

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See also 3245, 3269, 3280, 3281, 3299, 3309, 3315, 3728.

LIVER AND BILIARY TRACT

Chronic Hepatitis

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See also 3188, 3249, 3260, 3262, 3434, 3719, 3736, 3801.

LIVER AND BILIARY TRACT

Alcoholic Liver Disease

3779 EFFECT OF ORAL ALCOHOL ADMINISTRATION ON THE BLOOD ALCOHOL LEVELS OF HABITUAL DRINKERS AND PATIENTS WITH LIVER DISEASE SUBJECTED TO VARIOUS DIETS. *(Ger.)* Mallach, H. J. (Med. Clin., Univ. Tubingen, Germany). *Klin. Wochenschr.* 50(15):732-738, 1972.

After overnight fasting and administration of 0.75 g/kg alcohol p.o., blood alcohol levels were measured in 16 alcoholics (1 female and 15 males; average age 47.6 yr) with hepatosis and fatty liver (7), initial cirrhosis (3), and advanced cirrhosis (6) confirmed by biopsy and laparoscopy. Although there were no significant differences between these groups because of scattering, the highest mean maximum alcohol level and the shortest time (55 min) between drinking and attainment of the maximum were observed in patients with advanced cirrhosis. This increased alcohol absorption in patients with advanced cirrhosis may be due to the atrophic gastritis which these patients often have and which would probably increase alcohol diffusion. Blood alcohol levels were also measured in 7 patients with cirrhosis and in 12 with no liver disease after ingestion of a standard breakfast of about 1000 calories and the same dose of alcohol. Prior administration of the test meal reduced the maximum blood alcohol level by 0.2 parts per thousand. No difference was found between blood alcohol levels in patients with cirrhosis and those in the controls.

3780 ACUTE FATTY METAMORPHOSIS OF THE LIVER IN PREGNANCY. *(Sp.)* Giaconi Gandolfo, J.; Velasco Rayo, M.; Katz Ugarte, R. (Salvador Hosp., Univ. Chile, Santiago de Chile). *Acta Gastroenterol. Latinoam.* 4(2):67-74, 1972.

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3786 ABNORMAL OXIDATION OF ^{14}C-FORMALDEHYDE TO $^{14}CO_2$ IN ERYTHROCYTES OF ALCOHOLICS AND NONALCOHOLICS AFTER CONSUMPTION OF ALCOHOLIC BEVERAGES. *(E.)* Tran, N.; Laplante, M.; Lebel, E. (Cent. Hosp. Univ. Sherbrook, Canada). *J. Nucl. Med.* 13(9):677-680, 1972.

3787 ANATOMICOPATHOLOGICAL AND BIOCHEMICAL CORRELATIONS IN CHRONIC ALCOHOLIC FATTY LIVER. *(Fr.)* Bertrand, J. L.; Mallein, R.; Brette, R. (Antiquaille Hosp., Lyon, France). *Lyon Med.* 227(2):117-121, 1972.

3788 PATHOLOGICAL PHYSIOLOGY OF ALCOHOLIC FATTY LIVER. *(Fr.)* Bertrand, J. L. (Antiquaille Hosp., Lyon, France). *Lyon Med.* 227(2):123-138, 1972.

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3792 RELATION BETWEEN THE FAT CONTENT OF THE LIVER AND REACTIVE HEPATITIS. *(Ger.)* Hanefeld, M.; Stotzner, H.; Jaross, W.; Renger, F. (Carl Gustav Carus Med. Acad., Dresden, Germany). *Z. Gesamte Inn. Med.* 27(16):702-705, 1972.

See also 3122, 3133, 3134, 3150, 3155, 3175, 3176, 3177, 3185, 3186.

LIVER AND BILIARY TRACT

Cirrhosis

3793 LACTULOSE THERAPY IN 80 PATIENTS WITH CIRRHOSIS: BASIC PRINCIPLES AND RESULTS. *(Ger.)* Muting, D.; Ordnung, W.; Arfeen, N.; Barth, V.; Reikowski, J. (Prof. Kalk Clin. Liver Dis., Gastrointestinal Metabolic Dis., Bad Kissingen-Hausen, Germany). *Dtsch. Med. Wochenschr.* 97(34): 1238-1243, 1972.

Since a preliminary trial of lactulose (70-80 g/day p.o.) increased the number of intestinal lactobacilli and reduced blood ammonia and serum free phenol levels in 10 cirrhotics with moderate to severe portal hypertension, lactulose therapy was given to 80 patients (68 men and 12 women) with cirrhosis of varying degrees of severity. Of 18 cirrhotics with severe portal encephalopathy, 6 died in hepatic coma as a result of bleeding esophageal varices or an acute necrotic crisis. Encephalopathy improved in 13 cases. The pH of these patients' stools and their blood ammonia levels decreased, while protein tolerance remained unchanged. Clinical findings showed even more improvement in 20 cirrhotics with mild portal encephalopathy: lactulose therapy was successful in 18 cases. Lactulose had to be discontinued in 2 of these patients, 1 of whom had undergone gastrectomy, because of severe diarrhea. Lactulose therapy was successful in 32 of 35 cirrhotics with portal hypertension but no encephalopathy. Blood ammonia levels decreased into the upper normal range and daily protein intake could be increased, but these patients were treated for longer periods and with larger doses than those of the preceding groups. Lactulose therapy was not effective in any of 7 cirrhotic patients without portal hypertension, and it had to be discontinued in 2 patients with ulcers because of flatulence and gastralgia. It is recommended that lactulose therapy be initiated with 5 g lactulose 5 times daily and increased to a maximum of 20 mg 5 times daily.

3794 ESOPHAGEAL VARICES, SPLENIC PULP PRESSURE AND "DIRECTIONAL" FLOW PATTERNS IN ALCOHOLIC LIVER CIRRHOSIS. *(E.)* Dagradi, A. E. (Long Beach VA Hosp., Calif.). *Am. J. Gastroenterol.* 59(1):15-22, 1973.

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3796 PORTAL DECOMPRESSION BY SPLENIC VEIN IMPLANTATION INTO LIVER OR KIDNEY. *(E.)* Chen, W. F.; Goldsmith, H. S. (Jefferson Med. Coll., Philadelphia, Pa.). *Am. J. Surg.* 125(2):200-203, 1973.

3797 FOCAL NODULAR HYPERPLASIA OF THE LIVER. *(E.)* Whelan, T. J., Jr.; Baugh, J. H.; Chandor, S. (U.S. Army Tripler Gen. Hosp., Honolulu, Hawaii). *Ann. Surg.* 177(2):150-158, 1973.

3798 COMBINED CAVAL AND PORTAL HYPERTENSION WITH CIRRHOSIS OF THE LIVER: A PROBLEM IN MANAGEMENT. *(E.)* Welling, R. E.; McDermott,

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3799 STUDY OF PARENCHYMAL FUNCTIONS AND HEPATIC BLOOD FLOW IN NON-CIRRHOTIC PORTAL FIBROSIS BY RADIOISOTOPE TECHNIQUES. *(E.)* Sama, S. K.; Minocha, S. K.; Basu, A. K.; Ahuja, M. L.; Tandon, B. N. (All India Inst. Med. Sci. Ansari Nagar, New Delhi). *Indian J. Med. Res.* 60(11):1612-1620, 1972.

3800 PITUITARY FUNCTION IN IDIOPATHIC HAEMOCHROMATOSIS AND CIRRHOSIS OF THE LIVER. *(E.)* Stocks, A. E.; Powell, L. W. (Royal Brisbane Hosp., Australia). *Lancet* (7772):298-299, 1972.

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3802 STUDY OF SERUM IMMUNOGLOBULIN BEHAVIOR IN HEPATIC CIRRHOSIS. *(Sp.)* de la Revilla, L.; Gutierrez, J.; Pena, J.; Garcia Torres, J. (Ruiz de Alda Sanit., Granada, Spain). *Rev. Clin. Esp.* 125(2):143-148, 1972.

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3805 CARCINOEMBRYONIC ANTIGEN(S) IN LIVER DISEASE. II. ISOLATION FROM HUMAN CIRRHOTIC LIVER AND SERUM AND FROM NORMAL LIVER. *(E.)* Kupchik, H. Z.; Zamcheck, N. (Boston City Hosp., Mass.). *Gastroenterology* 63(1):95-101, 1972.

3806 INDIAN CHILDHOOD CIRRHOSIS-A RE-EVALUATION OF ITS PATHOMORPHOLOGIC FEATURES AND THEIR SIGNIFICANCE IN THE LIGHT OF CLINICAL DATA AND NATURAL HISTORY OF THE DISEASE. *(E.)* Nayak, N. C. Visalakshi, S.; Singh, M.; Chawla, V.; Chandra, R. K.; Ramalingaswami, V. (All India Inst. Med. Sci., New Delhi). *Indian J. Med. Res.* 60(2):246-257, 1972.

3807 MECHANISM OF STEATORRHOEA IN CIRRHOSIS OF LIVER: CORRELATION BETWEEN CHOLATE CONCENTRATION AND BSP RETENTION AND VITAMIN B_{12} EXCRETION. *(E.)* Desai, H. G.; Merchant, P. C.; Zaveri, M. P.; Antia, F. B. (B.Y.L. Nair Charitable Hosp., Bombay, India). *Indian J. Med. Res.* 60(10):1464-1469, 1972.

See also 3115, 3140, 3276, 3391, 3603, 3768, 3774, 3827.

LIVER AND BILIARY TRACT

Gallbladder and Biliary Tract Diseases

3808 CHOLELITHIASIS IN ADOLESCENCE. *(Ger.)* Hennicke, W. (Reg. Hosp., Stassfurt, Germany). *Z. Aerztl. Fortbild.* 65(18):971-972, 1972.

Of 742 patients who underwent cholecystectomy between 1960 and 1969, 12 females were less than 20-yr old with the youngest aged 13 yr. This appears to indicate that cholelithiasis in adolescents is increasing since Kern reports that only 6 of 1639 patients cholecystectomized between 1952 and 1962 were less than 20-yr-old. A case report is presented for a 13-yr-old girl with a 2-yr history of cramp-like pain in the upper right abdomen which developed immediately after meals. Transitory jaundice had been observed by her parents. Radiological evidence of cholelithiasis was found. On surgery the gallbladder was found to contain more than 100 stones from the size of a pepper corn to a pea; the cystic duct was also full of stones, but the common bile duct remained unobstructed. Recovery was uncomplicated.

3809 EFFECT OF SECRETIN AND PANCREOZYMIN ON BILE SECRETION IN PATIENTS WITH AND WITHOUT SYMPTOMS OF CHOLESTASIS. *(Ger.)* Bode, C.; Lober, D.; Goebell, H.; Dolle, W.; Korner, K. (Med. Clin., Univ. Marburg/Lahn, Germany). *Acta Hepatogastroenterol.* 19(6):440-450, 1972.

3810 PRIMARY CANCER OF THE GALLBLADDER. *(Sp.)* Zarapico, M. (Fac. Med., Sevilla, Spain). *Rev. Esp. Enferm. Apar. Dig.* 38(6):681-696, 1972.

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3813 NONOPERATIVE RETAINED BILIARY TRACT STONE EXTRACTION. A NEW ROENTGENOLOGIC TECHNIQUE. *(E.)* Burhenne, H. J. (Children's Hosp. Adult Med. Ctr., San Francisco, Cal.). *Am. J. Roentgenol. Radium Ther. Nucl. Med.* 117(2):388-399, 1973.

3814 FAILURE OF OPERATIVE CHOLANGIOGRAPHY TO PREVENT RETAINED COMMON DUCT STONES. *(E.)* Hall, R. C.; Sakiyalak, P.; Kim, S. K.; Rogers, L. S.; Webb, W. R. (State Univ. New York, Upstate Med. Ctr., Syracuse). *Am. J. Surg.* 125(1): 51-63, 1973.

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3816 OVERLOOKED GALLSTONES AND THEIR RETRIEVAL? *(E.)* Patterson, H. C.; Grice, O. D.; Bream, C. A. (Univ. North Carolina Sch. Med., Chapel Hill). *Am. J. Surg.* 125(2):257-264, 1973.

3817 DAMAGE TO THE INTRAHEPATIC BILIARY SYSTEM FROM THE USE OF THE BALLOON-TIPPED CATHETER. *(E.)* Van Way, C. W., III; Sawyers, J. L. (Nashville Gen. Hosp., Tenn.). *Am. J. Surg.* 125(3):343-344, 1973.

3818 MODIFICATION OF BILE ACIDS BY INTESTINAL BACTERIA. *(E.)* Lewis, R.; Gorbach, S. (Mem. Hosp., New York). *Arch. Intern. Med.* 130(4): 545-549, 1972.

3819 CHOLEDOCHAL CYST AND DILATATION OF THE BILE DUCTS IN INFANCY AND CHILDHOOD. *(E.)* Somasundaram, K. (Univ. Hosp., Kuala Lumpur, Malaysia). *Aust. N. Z. J. Surg.* 42(2):163-167, 1972.

3820 LIVER TRANSPLANTATION IN BILIARY ATRESIA WITH CONCOMITANT HEPATOMA. *(E.)* Van Wyk, J.; Halgrimson, C. G.; Giles, G.; Lilly, J.; Martineau, G.; Starzl, T. E. (Univ. Colorado Med. Sch., Denver). *S. Afr. Med. J.* 46(26):885-889, 1972.

3821 SPLENOMEGALY IN UNCOMPLICATED BILIARY TRACT AND PANCREATIC DISEASE. *(E.)* Gregory, P. B.; Klatskin, G. (Yale Univ. Sch. Med., New Haven, Conn.). *Gastroenterology* 62(3): 436-440, 1972.

3822 DIAGNOSIS AND TREATMENT OF BENIGN BILIARY TRACT STRICTURE. *(E.)* Warren, K. W.; Whitcomb, F. W., Jr. (Lahey Clin. Fdn., Boston, Mass.). *Hosp. Pract.* 6(2):62-74, 1971.

3823 GALLSTONE ILEUS: REVIEW OF FORTY CASES. *(E.)* Safaie-Shirazi, S.; Printen, K. J. (Univ. Iowa Hosp., Iowa City). *J. Am. Geriatr. Soc.* 20(7):335-339, 1972.

3824 MANAGEMENT OF COMPLICATED BILIARY-TRACT DISEASE IN GERIATRIC PATIENTS. *(E.)* Grodsinsky, C.; Brush, B. E.; Ponka, J. L. (Henry Ford Hosp., Detroit, Mich.). *J. Am. Geriatr. Soc.* 20(11):531-536, 1972.

3825 A NEW THEORY OF BILIARY ATRESIA. *(E.)* Klippel, C. H. (Med. Coll. Ohio, Toledo). *J. Pediatr. Surg.* 7(6):651-654, 1972.

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See also 3244, 3275.

AUTHOR INDEX

NUMBERS FOLLOWED BY AN ASTERISK INDICATE ABSTRACTS. OTHER NUMBERS REFER TO CITATIONS.

AAGARD, P.
3359
ABBADESSA URSO, S.
3049
ABBOTT, W.M.
3613
ABE, H.
3059
ABEL, R.M.
3613
ABRAMS, M.
3421
ABRAMS, M.E.
3002*
ACHARI, G.
3052
ACHENBACH, H.
3378
ACHESON, L.S.
3015
ACOSTA, J.M.
3629
ADAM, Y.G.
3557
ADAMS, M.M.E.
3897
ADELMAN, H.
3444
ADHAM, N.F.
3649*
ADLERCREUTZ, H.
3620*
ADSON, M.A.
3611
AGID, R.
3017
AHO, A.J.
3641
AHREN, C.
3607*
AHUJA, M.L.
3799
AIHARA, K.
3151
AKERS, D.R.
3892
AKESSON, B.
3509*
ALARCON, G.S.
3755
ALAUPOVIC, P.
3246*
ALBERT, H.
3355
ALBERT-RECHT, F.
3756
ALBEPT, T.J.
3739
ALCALA-SANTAELLA, R.
3698
ALDAY, E.S.
3103
ALDERSON, G.L.
3783
ALELE, C.O.
3301
ALEMANY, J.R.
3401
ALEXANDER, J.F.
3713
ALKAN, W.J.
3585
ALLAN, J.G.
3766
ALLEN, J.E.
3565
ALLEN, J.R.
3156
ALLEN, R.G.
3674
ALLEN, T.S.
3296
ALLEN, W.D.
2980
ALONSO, A.
3081
ALP, M.H.
3432*
ALPERS, D.H.
3208
ALTEMEIER, W.A.
3845
ALTMANN, G.G.
2987
ALVARADO, F.
3003*
ALVARADO, J.
3517
ALVAREZ FERNANDEZ, E.
3698
AMBERG, J.
3266
AMBROSIO, A.S.
3335
AMDRUP, E.
3384*, 3385*
AMENT, M.E.
3487*
AMINEV, A.M.
3590
AMMANN, R.W.
3651*
ANDERSEN, D.
3374
ANDERSON, C.M.
3507*
ANDERSON, M.C.
3116*
ANDERSSON, R.G.G.
3047
ANDERSSON, S.
3070*
ANDREOTTI, G.
3122*
ANSELM, K.
3297
ANTHONISEN, P.
3614
ANTIA, F.B.
3807
AOKI, T.T.
3671*
AOYAMA, Y.
2972
APPERT, H.
3059
AQUINO, C.
3220
ARCHIBALD, R.W.R.
3230
ARCOS PEREZ, M.
3260
ARFEEN, N.
3793*
ARGUTINSKAIA, S.V.
3109
ARIEL, I.M.
3596
ARRIGO, L.
3069
ARZOUMANIAN, A.
3300
ASHCRAFT, K.W.
3351
ASHIDA, K.
2972
ASSODI, A.
3839
ASTRUP, T.
2988
ASZODI, A.
3874
ATIK, M.
3847
ATKINSON, M.
3421
AUBREY, A.
3085
AUBREY, D.A.
3072*, 3094
AURICCHIO, S.
3508*
AVASTHI, G.
3514
AVETISIAN, A.A.
2994
AVIOLI, L.V.
3208
AYALA, M.
3349
AYHAN, A.
3714
AYULO, J.A.
3321
AZIMI, F.
3320
AZNAR, J.
3401
B'HEND, P.
3121*
BABES, V.T.
3315
BABOT, B.
3360
BACHMAN, H.
3673*
BACK, P.
3174
BAETZ, B.A.
2988
BAGBY, R.J.
3492
BAGLIN, A.C.
3773

BAHR, R.
3912
BAILEY, J.
3886
BAKER, L.F.
3753
BAKER, W.H.
3678
BALASEGARAM, M.
3593
BALASUBRAMANIAM, K.
3167
BANCROFT, W.H.
3245*
BANERJEE, A.K.
3066
BANERJI, P.K.
3052
BANK, S.
3250*
BANWELL, J.G.
3211
BARABAS, A.P.
3399
BARAK, A.J.
3177
BARATTI, J.
2991
BARBARA, L.
3056
BARBARINO, F.
3101, 3769
BARBIER, P.
3511
BARILLAS, A.E.
3559
BARKER, H.G.
3540*
BARKER, W.F.
3612
BARNARD, D.
3526
BARNARDO, D.
3791
BARON, D.N.
3223
BARONE, R.M.
3646*
BARRANCO JIMENEZ, M.
3400
BARRETT-CONNER, E.
3856
BARROW, G.I.
3886
BARTH, C.A.
3170
BARTH, V.
3793*
BARTHOLOMEW, L.G.
3665
BASSADONE, E.T.
3421
BASTRUP-MADSEN, P.
3374
BASU, A.K.
3799
BATSAKIS, J.G.
3838
BATTIFORA, H.
3352
BAUDOUIN, A.
3861
BAUGH, J.H.
3797
BAUMANN, G.
3737
BAWNIK, J.B.
3472
BEAHRS, O.H.
3398, 3459, 3611
BEAL, J.M.
3493
BEAM, W.E., JR.
3734
BEATTIE, A.D.
3791
BEATTIE, E.J., JR.
3436*
BEAUDIN, D.J.
3283
BECK, I.T.
3283
BECK, J.M.
3896
BECK, O.A.
3711
BECKETT, R.B.
3154
BEESLEY, W.H.
3073*
BEHAR, M.
3517
BELL, F.R.
3095
BELLMANN, H.
3355
BEM, Z.
3531
BENAGES, A.
3312, 3346
BENEDETTI, E.L.
2966
BENET, L.Z.
3033, 3034
BENEVENTANO, T.C.
3556
BENFIELD, J.R.
3638
BENITEZ, C.J.
2996
BENITEZ RIVERO, A.
3898
BENNESS, G.T.
3163
BENNETT, A.
3078*
BERESNEVA, A.B.
3761
BERETTA, C.
3065
BERGER, I.
3677
BERKSON, P.
3444
BERN, H.A.
3021
BERNALDO DE QUIROS, J.
3898
BERNIER, J.J.
3026
BERNSTEIN, L.H.
3515
BERRAL DOMINGUEZ, A.
3898
BERRY, E.G.
3917
BERSIMBAEV, R.I.
3109
BERSON, S.A.
3290
BERTACCINI, G.
3042*
BERTI, F.
3110
BERTRAND, J.L.
3150, 3787, 3788
BERWING, K.
3751
BETTARELLO, A.
3418
BEUS, I.
3609
BEZJAK, B.
3609
BHANSALI, S.K.
3676
BHARGAVA, A.
3550
BHARGAVA, U.
3906
BHARUCHA, K.R.
3032
BIANCHI-BOSISIO RIGHETTI, A.
3178
BIBER, B.
3214*
BICKEL, J.G.
3242*
BIERNAT, J.
3128
BIESOLD, D.
3673*
BIGGERSTAFF, C.R.
3222
BIN DATO SALLEH, H.
3593
BINDER, H.J.
3197*
BINDER, V.
3614
BIRCOLL, M.
3450
BIRNBAUM, D.
3427
BIRTLES, C.J.
3523
BJURSTAM, N.
3702
BLACKWOOD, W.D.
3007*, 3369
BLANCHON, P.
3663
BLARIZA, H.R.
3404

BLENDIS, L.M.
3688
BLIAU, O.R.
3452
BLINDER, L.V.
3187
BLUE, S.K.
3628
BLUM, A.L.
3229
BLUMBERG, B.S.
3731
BOBROFF, L.M.
3556
BOCHENEK, W.
3531
BODANSZKY, M.
3206
BODE, C.
3809
BODNER, E.
3655
BOECKL, O.
3227
BOGGS, J.D.
3679
BOHMER, R.
3262
BOILEAU, G.R.
3465
BOLINGER, R.A.
3007*
BOLTON, T.B.
3008*
BOMBECK, C.T.
3414
BONFIELD, R.E.
3437
BONFILS, S.
3071*, 3835*
BONNEVIE, O.
3614
BONTE, J.
3564
BOOTH, C.C.
3510*
BOOTH, W.V.
3430*
BORGES, J.M.G.
3710
BORGES, M.A.G.
3710
BOROWITZ, J.L.
3040*
BORTOLOTTI, M.
3056
BOSE, S.M.
3572
BOSMANN, H.B.
2998
BOSZKO, A.
3332
BOUCHET, A.
3920
BOUCHIER, I.A.D.
3421
BOUHOUTSOS, J.
3399

BOULETREAU, P.
3730*
BOUR, H.
3470
BOURGEON, R.
3921
BOUSQUET, W.F.
3155
BOWEY, R.R.
3464
BOYCE, H.W., JR.
3272
BOZORGI, S.
3334
BRADLEY, B.R.
3230
BRADLOW, H.L.
3692
BRALOW, S.P.
3422, 3423
BRANESCU, L.
3315
BRASCA, A.
3185
BRAUMAN, J.
3391
BRAWLEY, R.K.
3328
BRAYTON, M.A.
3133*
BREAM, C.A.
3816
BREATHNACH, A.S.
2997
BREGLIA, R.J.
3180
BREITENFELD, V.
3609
BREMER, A.
3067
BRENNAN, T.G.
3485*
BRETTE, R.
3150, 3787
BREUER, H.
3209, 3210
BREUER, R.I.
3383*
BREWER, R.A.
3859
BRIGHT-ASARE, P.
3197*
BRIN, H.
3195*
BRINDLEY, G.V., JR.
3350
BRODER, M.S.
3880
BROM, B.
3250*
BROOKS, F.P.
3425
BROSS, T.
3697
BROTMAN, M.
3367
BROWN, A.L., JR.
3665

BROWN, C.H.
3491
BROWN, D.G.
3014
BROWN, J.C.
3205
BROWN, P.W., JR.
3459
BROWN, R.A.
3647*
BROWN, S.M.
3484*
BROWN, W.R.
3432*
BROWNE, R.W.
3854
BRUCKE, P.
3439
BRUGERE, J.
3848
BRUMBAUGH, P.F.
3192*
BRUNI-CELLI, B.
3364
BRUNSWIG, D.
3720
BRUNT, P.W.
3756
BRUSH, B.E.
3824
BUCHANAN, W.M.
3699
BUCKLEY, C.E., III
3433*
BUCKWALTER, J.A., JR.
3602
BUENO, J.
3774
BULIGESCU, L.
3771
BULL, D.M.
3606*
BUNNAG, D.
3275
BUR, F.
3431*, 3469
BURHENNE, H.J.
3813
BURK, R.F.
3014
BURNS, G.P.
3072*, 3085, 3094
BURRINGTON, J.D.
3363
BUSCH, H.J.
3734
BUSSE, H.
3778
BUSSE, H.J.
3776
BUSSOLATI, G.
2968
BUTIKOFER, E.
3651*
BUTTERFIELD, W.C.
3416
BUTTERY, J.E.
3223

CAFLISCH, C.R.
3087
CAHILL, G.F., JR.
3671*
CAHN, R.C.
3164
CAILLE, J.P.
3029
CALABRESE, C.T.
3557
CALENOFF, L.
3844
CALLENDER, S.T.
3366
CALVO DE OLMO, T.
3263
CAMERON, A.J.
3836*
CAMERON, C.T.M.
3569
CAMPBELL, J.J.
3406
CANIGIANI, G.
3254
CANNATA, B.
3081
CARBALLO, J.
3059
CARBONI, M.
3253, 3670
CARLBORG, L.
3108
CARLONE, M.F.
3222
CARNEVALI, L.
3307
CARREA, G.
2992
CASELLA, M.C.
3603
CASELLATO, M.M.
2992
CASTELFRANCHI, P.L.
3640
CASTIGLIONI, L.J.
3296
CASTILHO, I.M.P.
3913
CASTRO, E.B.
3541*
CAVALLERO, C.
3307
CAZILLIS, M.
3138
CEIDE-ECHEVARRIA, A.
3411
CENEDELLA, R.J.
3154
CENEVIVA, R.
3640
CENTENO, R.
3437
CERDA, J.J.
3642
CERINI, C.E.
3841
CERNA, I.
3228
CERVENKA, C.F.
3461
CERVENKA, J.D.
3461
CHABES, A.
3529
CHACHOWSKI, R.
3299
CHAIMOFF, C.
3681, 3874
CHAITIN, H.
3460
CHAKRAVARTI, K.R.
3605*
CHAKRAVARTI, R.N.
3605*
CHALLACOMBE, D.N.
3523
CHANDLER, J.G.
3107
CHANDOR, S.
3797
CHANDRA, R.K.
3733, 3806
CHAPARAS, S.D.
3724
CHARALAMBIDES, V.A.
3527
CHATURVEDI, R.P.
2995
CHAUDHARY, M.A.
3518
CHAWLA, V.
3806
CHAYVIALLE, J.A.
3104
CHEN, S.C.
3116*
CHEN, W.F.
3796
CHENG, B.
3011*
CHERNIKOV, M.P.
3028
CHERNISH, S.M.
3291
CHERNOV, M.S.
3396
CHESNEY, C.F.
3156
CHEVALLIER, F.
3181
CHHUTTANI, P.N.
3514, 3605*
CHILD, J.A.
3499
CHIU, C.J.
3221
CHMIELOWA, M.
3530
CHONGSUPHAJAISIDDHI, T.
3275
CHOWDHARY, S.C.
2995
CHRISTIANSEN, J.
3106
CHRISTOFFERSEN, T.
3134*
CICCIMARRA, F.
3508*
CIVERA, R.G.
3312, 3346
CLARK, R.D.
3367
CLARKE, S.K.R.
3851
CLASSEN, M.
3010*, 3389*
CLEARFIELD, H.R.
3238*
CLEMENTS, J.L., JR.
3492
CLENDINNEN, B.G.
3077*
COHEN, L.E.
3543*
COHEN, S.
3041*, 3387*
COHEN, W.N.
3842
COHEN, Z.
3815
COHN, I., JR.
3430*, 3561
COHN, J.N.
3785
COLDEFY, J.M.
3888
COLIN, R.
3477
COLLAN, Y.
2999
COLOMBATO, L.O.
3125
COMBE, P.
3308
CONN, H.C.
3289
CONNELL, A.M.
3712
CONNON, J.J.
3671*
CONRAD, M.E.
3245*
COOK, F.B.
3396
COOK, G.T.
3851
COOK, M.A.
3205
COOK, M.G.
3496
COOK, W.A.
3334
COOKE, A.R.
3362
COOPER, C.W.
3222
COPEREIRO HALLI, J.I.
3630
CORAN, A.G.
3324
CORCHS, J.L.
3013
CORLIN, R.F.
3502*

NUMBERS FOLLOWED BY AN ASTERISK INDICATE ABSTRACTS. OTHER NUMBERS REFER TO CITATIONS.

CORNELL, H.J.
3500*
CORNFELD, D.
3522
CORRADINO, R.A.
3200*
CORRIERE, J.N., JR.
3145
COSIN, J.A.
3312
COSSART, Y.E.
3747
COULERU, O.
3759
COUTURIER, D.
3057
COX, B.
3063
CRABTREE, R.E.
3860
CRAIG, S.H.
3569
CREAMER, B.
3534
CREMA, A.
3582
CROS, R.C.
3803
CROWSON, W.N.
3601
CRUCEANU, A.
3315
CRUCIOLI, V.
3478*
CSENDES, A.
3349
CUARON, A.
3237*
CUCCURULLO, L.
3696
CUEVAS, P.
3019
CULBERTSON, W.R.
3845
CULLEN, J.
3332
CUMMINGS, J.H.
3497, 3868
CURI, C.A.
3125
CURRAN, P.F.
3031
CURRERI, P.W.
3849
CURWAIN, B.P.
3089, 3217*
CZOK, G.
3171
D'HOLLANDER, F.
3181
D'ISA, L.
3310
DACOSTA, L.R.
3283
DAGRADI, A.E.
3794
DAHLGREN, S.
3108
DAHM, I.
3604
DALLNER, G.
3139
DAMMANN, H.G.
3171
DANHOF, I.E.
3086
DANOVITCH, S.H.
3736
DANYSZ, A.
2986
DAS GUPTA, T.K.
3646*
DASHEVSKII, IU.IA.
3891
DAVID, E.
3459
DAVIES, E.R.
3244*
DAVIES, T.
3505*
DAVRI-KARAMOUZI, Y.
3732
DAWSON, A.M.
3499
DE ARZUA ZULAICA, E.
3446
DE BRITO, T.
3710
DE CASTRO DEL POZO, S.
3263
DE JONGE, H.R.
3202
DE LA REVILLA, L.
3802
DE LUCCA, J.O.H.
3850
DE MAGALHAES, A.F.N.
3850
DE MICHELE, A.
3310
DE MIGUEL, J.
3403
DE PRADO, R.
3312
DE RECONDO, A.M.
3138
DEBRAY, C.
3057
DECHAVANNE, M.
3730*
DECKER, K.F.A.
3170
DECKERT, F.
3355
DEDIU, S.
3770
DEGRAEF, J.
3080
DEIMER, E.
3254
DEJICA, D.
3619
DEL TACCA, M.
3582
DELCLOS, L.
3717
DELGADILLO-LORA, G.
3441
DELIGEORGIS, D.
3872
DEMETRIOU, D.
3732
DEMLING, J.
3010*
DEMLING, L.
3010*, 3389*
DEMOFONTI, A.
3159
DEN OTTER, G.
3429
DEN OTTER, W.
2971
DENARDO, G.L.
3230
DENBESTEN, L.
3382*
DENCK, H.
3440
DENCKER, H.
3247*, 3248*
DENK, H.
3184
DEO, M.G.
3782
DEREN, J.J.
3503*
DEREUME, J.P.
3903
DESA, D.J.
3455
DESAI, H.G.
3807
DESHPANDE, C.K.
3676
DESNUELLE, P.
2991
DESPRES, P.
3521
DETHLEFSEN, L.A.
2976
DEVAUX, M.A.
3185
DEVENEY, K.
3074*
DEVROEDE, G.J.
3576
DEYHLE, P.
3651*
DEYSINE, M.
3207
DHAR, P.
3784
DI MARTINO, C.
3159
DI TORO, R.
3696
DIAMOND, A.
3831
DIETERLEN-LIEVRE, F.
3129
DIETZMAN, D.E.
3740
DILLARD, R.
3674

DIMAGNO, E.P.
3504*
DINBAR, A.
3876
DINI, M.
3135*
DINNER, M.
3896
DINTSMAN, M.
3681, 3839, 3874
DIOP, B.
3922
DIWOK, K.
3538
DOBBINS, W.O., III
3397, 3433*
DOCKERTY, M.B.
3576
DODDS, W.J.
3867
DOISY, E.A., JR.
3142
DOLETSKII, S. IA.
3452
DOLLE, W.
3809
DOMSCHKE, S.
3010*, 3389*
DOMSCHKE, W.
3010*, 3389*
DONATH, R.
3286
DONATO, J.O.
3445
DONIACH, D.
3765
DOSS, J.
3093
DOUGLAS, J.F.
3224
DOUST, V.L.
3235*
DOVE, J.T.
3724
DOWLING, M.D., JR.
3579
DRAGSTEDT, L.R., II
3124
DRAPER, D.A.
3701*
DRASAR, B.S.
3510*
DREILING, D.A.
3621*
DREYFUS, J.
3648*
DREZNIK, Z.
3876
DRYBURGH, J.R.
3205
DUBOIS, A.
3067
DUBOIS, D.D.
3398
DUBOIS, R.S.
3432*
DUCHIER, J.
3470
DUNCKLEY, G.G.
3212
DUPUIS, Y.
3020
DURET, R.L.
3044, 3442
DUSZYNSKI, D.O.
3251
DUTTA, P.
3073*
DUVAL, C.
3477
DYCE, B.
3649*
DYCK, W.P.
3119*
DYER, N.H.
3499
DYKES, P.
3421
EASLEY, G.W.
3410
EATON, S.B.
3304
EATON, S.B., JR.
3270
ECHAVE, V.
3647*
ECKER, R.R.
3329
ECTORS, P.
3080
EDDLESTON, A.L.W.F.
3768
EDELSON, J.
3224
EDER, M.
2964*
EDGINGTON, T.S.
3107
EDMONDSON, H.T.
3395
EDWARDS, D.A.W.
3345
EGGENTON, J.
3048
EGGER, G.
3137
EGGLESTONE, S.I.
3851
EHRKE, D.
3700
EICHHOLZ, A.
3018
EICHNER, B.
3673*
EILERT, J.B.
3352
EISEMAN, B.
3153, 3381*
EISENBERG, M.M.
3073*, 3560
EISENBUD, L.
3498
EISMANN, R.
3778
EL SHAFIE, M.
3562, 3599
ELDER, J.B.
3120*
ELIAKIM, M.
3687
ELISEEV, M.N.
3590
ELISEEVA, O.I.
3590
ELLIOTT, W.H.
3142
ELLISON, R.G., JR.
3889
ELMSLIE, R.G.
3127
ELSBORG, L.
3374
EMAS, S.
3090, 3113, 3114
EMURA, T.
3236*
ENDERLE, F.J.
3624
ENDO, M.
3348
ENGERT, R.
3126
ENWONWU, C.O.
2975
ERICKSON, W.G.
3828
ESHCHAR, J.
3585
ESPINER, H.J.
3574
ESPMARK, J.A.
3729*
ESTENNE, B.
3662
ESTENNE, M.
3662
ETAIX, J.P.
3635
EURENIUS, K.
3849
EUSEBIO, E.B.
3560
EVANS, D.F.
3536
EVANS, J.A.
3475
EWE, K.
3023
FARA, J.
3214*
FARLEY, R.D.
3203
FARMER, R.G.
3683, 3901
FARNARIER, F.
3055
FARRELL, R.L.
3294
FASTH, S.
3058
FAUCHIER, C.
3308
FAUSTINI, R.
3065

NUMBERS FOLLOWED BY AN ASTERISK INDICATE ABSTRACTS. OTHER NUMBERS REFER TO CITATIONS.

FAVARA, B.E.
3892
FEAGLER, J.R.
3672*
FEDERMAN, Q.
3547
FEHER, J.
3777
FEIGL, W.
3000
FEINMAN, L.
3186
FELDMAN, M.
3331
FELIG, P.
3671*
FELIX, W.R.
3412
FELLENIUS, E.
3176
FENGER, H.J.
3317
FENOGLIO, C.M.
3542*
FERNANDEZ DE LIS, S.
3630
FERNANDEZ FLOREZ, W.
3630
FERNANDEZ-PACHECO, A.
3698
FERRIS, A.A.
3743
FERRUCCI, J.T., JR.
3270, 3304
FEWEL, J.
3215*
IASSE, R.
3513
ICARRA, B.J.
3633
ICHOT, O.
3138
IELDING, J.F.
3277
IGUEROA, L.
3908
IGUEROA, M.A.
3657
ILECCIA, R.
3049
ILIPPOVA, L.V.
3051
INARDI, G.
3307
INE, J.
3019
INEGOLD, S.M.
3869
INGERUT, J.
3004*
INKEL, M.
3547
INKELSTEIN, G.
3004*
ISCHER, H.
3235*
ISCHER, J.E.
3613
FISCHERMAN, K.
3359
FISER, D.
3342
FISHER, J.M.
3356*
FISHER, R.
3041*
FISHER, R.D.
3328
FISHER, R.S.
3387*
FITCHETT, C.W.
3652
FITZGERALD, J.F.
3624
FLAKS, B.
2978
FLEMSTROM, G.
3076*
FLETCHER, W.S.
3558
FLORES, J.M.
3517
FODOR, O.
3769
FOLKENBORG, O.
3614
FOLTYN, H.
3532
FOMCHENKO, A.I.
3884
FONT, R.G.
3271
FONTAINE, J.L.
3278
FORDTRAN, J.S.
3386*
FORLAND, S.C.
3034
FOROOZAN, P.
3612
FORTNER, J.G.
3436*, 3623
FOSTER, G.S.
3613
FOURNIER, A.
3020
FOURNIER, P.
3020
FOUTS, J.R.
3169
FOX, A.
3391
FOX, H.A.
3880
FOX, K.R.
3265
FRABLE, W.J.
3319
FRAISSE, H.
3635
FRANCIOSI, R.A.
3892
FRANK, H.A.
3343
FRANKLIN, A.J.
3571
FRAZEE, W.J.
3156
FREDRICKS, G.
3783
FREEDLAND, R.A.
3133*
FREEDMAN, M.A.
3666
FRENCH, S.W.
3783
FREYRE, E.A.
3529
FREYTES, M.A.
3404
FRIGO, G.M.
3582
FRITZSCHE, H.
3227
FRIZZELL, R.A.
3012*, 3015
FUGUEROA, E.
3081
FUHRMAN, M.
3811
FUJIWARA, Y.
3064
FUKUDA, H.
3050
FULKER, M.J.
3496
FULLEN, W.D.
3845
FUNDING, J.
3359
FUNG, W.P.
3775, 3790
FUTCH, C.
3708*
GABURRO, D.
3122*
GAGLIARDI, R.A.
3394
GALAMBOS, J.T.
3713
GALIAN, P.
3773
GALLAGER, S.
3717
GALLAGHER, T.F.
3692
GALLINA, G.
3065
GALLIVAN, G.J.
3329
GALVAN, G.
3227
GAMMILL, S.L.
3843
GANDSAS, M.
3657
GARCIA CARDO, A.
2967
GARCIA-CASTINEIRAS, S.
3003*
GARCIA-CONDE GOMEZ, F.J.
3312
GARCIA GARCIA, F.J.
3698

GARCIA TORRES, J.
3802
GARDINER, H.
3846
GASPARIAN, S.A.
3187
GAUTHIER, A.
3635, 3803
GAVRIUSHOV, V.V.
3452
GAYRAL, F.
3888
GAZETOV, B.M.
3591
GEENEN, J.E.
3516
GEFFROY, Y.
3477
GEIER, G.R., JR.
3566
GELFAND, D.W.
3458
GELFAND, M.D.
3615
GELIS, C.
3226
GELZAYD, E.A.
3458
GENIN, J.
3848
GENTILI, B.
3159
GERICHTER, C.B.
3875
GERICKE, A.
2984
GERIN, Y.
3148, 3149
GERMAN, A.
3759
GERWIG, W.H., JR.
3410
GESERICK, G.
3257
GEUMEI, A.
3086
GHADIMI, H.
3664
GHANEM, M.H.
3919
GHEORGHIU, T.
3341
GHOSH, M.L.
3690
GIACONI GANDOLFO, J.
3780
GILES, G.
3820
GILES, G.R.
3485*
GILLES, M.R.
3057
GILLET, A.
3661
GILLETTE, P.N.
3692
GILLISON, E.W.
3414
GILMOUR, H.M.
3233*
GILSDORF, R.B.
3636
GINSBERG, A.L.
3245*
GIOFFRE, L.
3603
GIRARD, M.M.
3878
GIRAULT, M.J.
3470
GIRMES, D.H.
3703
GITNICK, G.L.
3269, 3758
GLANZ, I.
3681
GLASCO, E.
3346
GLASS, G.B.J.
3380*
GLAYSHER, C.
3571
GLENN, F.
3219, 3900
GLOTZER, D.J.
3343
GLUCKMANN, R.F.
3297
GO, V.L.W.
3504*
GODARD, J.E.
3323
GODEAU,
3662
GOEBELL, H.
3809
GOFFIN, M.
3811
GOKOZ, A.
3714
GOLDEERG, A.
3791
GOLDBERG, B.B.
3238*
GOLDBERG, H.I.
3033
GOLDBLATT, P.J.
3161
GOLDEOURT, U.
3427
GOLDENBERG, H.
3284
GOLDSMITH, E.I.
3219
GOLDSMITH, H.S.
3103, 3796
GOLDSTEIN, G.
3249*
GOLIGHER, J.C.
3384*, 3385*
GOMEZ PARRA, M.
3400
GONZALEZ, G.
3322
GOODGAME, J.T.
3211
GOODMAN, C.R.
3722
GOODMAN, G.A.
3238*
GOODMAN, I.
3061
GOODMAN, R.
3471
GORANSSON, G.
3509*
GORBACH, S.
3818
GORDON, F.
3237*
GOSSIUN, A.
3903
GOTHLIN, J.
3234*, 3318
GOTO, A.
3236*
GOTTLIEB, L.
3784
GOUGH, K.R.
3244*
GRASSET, L.
3138
GRASSO, P.
2970
GRAYSON, R.R.
3426
GREEGOT, D.H.
3282
GREENBAUM, E.I.
3554
GREENSTEIN, A.
3621*
GREGG, J.A.
3520
GREGORY, P.B.
3821
GRENIER, J.F.
3123*
GRETZ, H.
3285
GRICE, O.D.
3816
GRIFFEL, B.
3472
GRIFFEN, W.O., JR.
3213
GRIFFITHS, J.D.
3580
GRIGOR, M.R.
3212
GRIMM, U.
3259
GRODSINSKY, C.
3824
GROSS, M.
2997
GROSSE, H.
3408
GROSSMAN, M.I.
3866
GROSSO, G.
3062
GROSSOWICZ, N.
3195*

GROSZMANN, R.
3785
GROVER, N.K.
3643
GRUBER, C.E., JR.
3860
GRUN, M.
3173
GRUNDY, S.M.
3240*
GRUNNET, N.
3175
GUDMAND-HOYER, E.
3317
GUELRUD, M.
3118*
GUILLCU, P.J.
3485*
GUINEY, E.J.
3339
GUIRGIS, F.K.
3919
GUIRGIS, H.
3840
GULATI, S.M.
3643
GULLO, L.
3185
GUNTHER, K.
3673*
GUPTA, M.C.
3721
GUPTA, S.
3120*
GURD, F.N.
3221, 3647*
GUTIERREZ, A.
3738
GUTIERREZ, J.
3802
GUTSTEIN, S.
3515
GUTTMAN, F.
3454
GUY-GRAND, B.
3470
GUYNN, R.
3165
HACKENSCHMIDT, H.J.
3170
HACKER, J.
3010*
HADASOVA, E.
3035
HADORN, B.
3121*
HADORN, H.B.
3129
HAGE, G.
3185
HAGEN, T.C.
3383*
HAJJAR, J.J.
3031
HAKKINEN, I.
3725
HALDEMANN, B.
3121*
HALE, H.W., JR.
3396
HALGRIMSON, C.G.
3820
HALL, R.C.
3814
HALL, T.S.
3851
HALL, W.H.
3424
HALLER, J.A., JR.
3562, 3599
HALLGREN, H.M.
3265
HAMEED, S.
3721
HAMILTCN, T.P., II
3739
HAMZA, K.N.
3382*
HANDMAKER, H.
3270
HANEFELD, M.
3158, 3792
HANSEN, E.A.
3112
HANSEN, H.J.
3540*
HANSEN, J.D.L.
3536, 3537
HANSEN, O.H.
3435*
HANSON, R.F.
3140
HARA, Y.
3243*
HARDAS, K.P.
3448
HARDCASTLE, P.T.
3048
HARELL, G.S.
3230
HARGREAVES, T.
3691
HARKONEN, M.
3620*
HARRISON, D.F.N.
3326, 3327
HARRISON, E.G., JR.
3459, 3836*
HARRY, D.S.
3135*
HART, I.R.
3762
HARTMANN, G.
3801
HARTMANN, J.R.
3672*
HARTROFT, W.S.
3186
HARVEY, R.F.
3592
HASHEMIAN, H.
3916
HATFIELD, G.K.
3155
HAUSSLER, M.R.
3192*
HAVERBACK, B.J.
3649*
HAVIG, O.
3830
HAWK, W.A.
3491
HAWK, W.A., JR.
3683
HAYASHI, Y.
3151
HAYES, M.A.
3551
HAYES, M.F., JR.
3409
HAYNES, D.W.G.
3754
HAYNES, M.E.
3754
HEADING, R.C.
3030
HEATON, K.W.
3526
HEDRICK, S.R.
3724
HELL, E.
3227
HELLIER, M.D.
3005*
HELWING, E.
3912
HEMET, J.
3477
HENDEL, L.
3106
HENDERSON, R.D.
3332
HENDRICKSE, R.G.
3909
HENDRIX, T.R.
3211
HENDY, R.
2970
HENNESSEY, K.N.
3855
HENNICKE, W.
3808*
HENSLEY, G.T.
3516, 3867
HERMAN, A.H.
3567
HERMS, G.
3377, 3760
HERNANDEZ FELICIANO, M.
3894
HERNBERG, S.
3725
HERTER, F.
3540*
HERTZBERG, J.
3830
HERZBERG, M.
3472
HEWITT, W.L.
3758
HEYMANN, H.
3912
HIATT, R.B.
3061

HIDALGO, F.
3535
HIGHT, D.
3559
HIGHTOWER, N.C.
3119*
HILDEBRAND, J.
3148, 3149
HIMAL, H.S.
3333
HINCHLIFFE, A.
3244*
HISLOP, I.G.
3464
HIVET, M.
3663
HOBBS, B.C.
3886
HOBEL, C.J.
3758
HOBSON, R.W., II
3563
HOFFMAN, W.A.
3490
HOFFMANN, H.
3700
HOFFRICHTER, E.
3255
HOFMANN, A.F.
3684
HOGAN, W.J.
3867
HOHENLEITNER, F.J.
3102
HOLBOROW, E.J.
3745
HOLDSWORTH, C.D.
3005*
HOLEN, J.T.
3306
HOLLENDER, L.F.
3431*, 3468, 3469, 3648*,
3661
HOLLER, A.
3663
HOLT, S.J.
2996
HOLTON, P.
3089, 3217*
HOLTZAPPLE, P.G.
3522
HOPFER, U.
3006*
HOSKING, G.E.
3421
HOSSAINI, A.A.
3701*
HOST, W.R.
3215*
HOWARD, F.A.
3045
HOWARD, J.M.
3059
HOWELL, K.E.
3018
HOYUMPA, A.M., JR.
3712
HSIEH, J.
3215*
HUBNER, G.
2964*
HUCHTON, P.
3406
HUCKABEE, W.E.
3671*
HUIZENGA, K.A.
3610
HUKUHARA, T.
3064
HULSMANN, W.C.
3202
HULTEN, L.
3058, 3607*
HUMPHREY, C.S.
3384*, 3385*
HUMPHREYS, S.R.
3836*
HUNT, T.
3421, 3852
HUNT, T.W.
3279
HURLEY, E.J.
3331
HUTTER, H.J.
3538
IBEN, A.B.
3331
IBER, F.L.
3196*
IGNACZAK, T.F.
3606*
IHRE, T.
3600
ILLING, R.C.
3829
IMPICCIATORE, M.
3042*
IMRE, J.
3353
INBERG, K.R.
3232*
INDACOCHEA-REDMOND, N.
3704
INNES, A.J.
3652
INUI, M.
3826
IOVANNITTI, C.
2967
IRONSIDE, A.G.
3853
ISAACS, F.
3152
ISENBERG, J.I.
3866
ISHII, H.
3132*
ISLAM, N.
3723
ISSELBACHER, K.J.
3006*
IWANOV, E.
3539
JACKMAN, R.J.
3576
JACOBS, C.F.
3918
JACOBS, E.
3903
JACOBS, N.E.
3918
JACOBSON, E.D.
2965*
JACQUES, P.J.
3149
JAGERSTAD, M.
3130
JAKAB, L.
3777
JAMES, A.E., JR.
3270
JAMES, W.P.T.
3497
JANECZKO, J.
3902
JANOWITZ, H.D.
3118*, 3119*, 3484*
JANUKOWICZ-LORENZ, H.
3653
JARETZKI, A, III
3336
JAROSS, W.
3158, 3256, 3792
JAROWSKI, C.I.
3180
JASCALEVICH, M.E.
3415
JAVITT, N.B.
3434*
JAWAHARLAL, K.
3110
JAYA RAO, K.S.
3528
JEANMAIRE, N.
3092
JEEJEEBHOY, K.N.
3332
JELENKO, C, III
3889
JERVELL, K.F.
3134*
JESSEPH, J.E.
3624
JEWETT, T.C.
3565
JIRSCH, D.W.
3079*
JOCOVIC, N.
3342
JOHANNESSON, E.
3105, 3248*
JOHANSEN, A.
3435*
JOHANSSON, H.
3108
JOHANSSON, I.
3088
JOHNSON, F.L.
3672*
JOHNSON, G.K.
3516, 3867
JOHNSON, J.S.
3726
JOHNSON, L.

3189*
JOHNSON, L.R.
2965*
JOHNSON, R.M.
3646*
JOHNSON, W.D.
3417
JOHNSTON, D.
3384*, 3385*
JOLLY, J.G.
3298
JOLY, J.G.
3132*
JONDORF, W.R.
3228
JONEK, J.
2985
JONES, F.L., JR.
3854
JONES, R.F.
3615
JOS, J.
3508*
JOSEPH, R.R.
3235*
JOSEPHSON, R.L.
2987
JOSKE, R.A.
3763, 3767
JOUANNEAU, P.
3477
JOYNER, J.T.
3302
JOZSA, L.
3777
JURCZAK, M.E.
3091
ACHELHOFFER, J.
3123*
ALA, P.C.
3550
ALAYOGLU, M.
3910
ALLAI, L.
3609
ALUND JENSEN, H.
3544
AMAL, I.
3339
AMINSKA, O.
2985
AMINSKI, M.
2985
ANAYAMA, R.
3133*
ANAZAWA, M.
3361
ANE, A.
3546
ANEKO, M.
3305
APLAN, M.M.
3178, 3287
APLOWITZ, N.
3434*
APOOR, K.
3052
APPAS, A.
3692
KARACADAG, S.
3714
KARAMBULA, K.
3732
KARJOO, M.
3522
KARLI, P.
3725
KASLIWAL, R.M.
3907
KATSILABROS, L.
3882
KATTAMIS, C.
3732
KATZ, M.
3677
KATZ UGARTE, R.
3780
KATZKA, I.
3498
KAUFMAN, H.J.
3430*
KAUFMAN, S.
3899
KAUR, J.
3914
KAUR, S.
3514
KAVLIE, H.
3376
KAY, A.W.
3120*
KAY, S.
3319
KAYE, G.I.
3542*
KEEFFE, E.J.
3394
KEELEY, A.
3784
KEET, M.P.
3537
KEITH, R.G.
3659
KEKOMAKI, M.P.
3232*
KELLEHER, J.
3505*
KENDALL, F.M.
3054
KENT, T.H.
3602
KENWRIGHT, S.
3533
KERN, F., JR.
3432*, 3483*
KERSEY, J.H.
3265
KEWENTER, J.
3043*, 3607*
KEYNAN, A.
3617
KEYS, T.F.
3758
KHALIK, F.
3115
KHURI, B.N.
3031
KIEFFER, R.F.
3328
KIEKENS, R.
3391, 3441
KIESSLING, K.H.
3176
KIKER, K.W.
3014
KILLIAN, M.K.
3242*
KIM, S.K.
3814
KINGRY, R.L.
3563
KIRCHGESSNER, M.
3037
KIRCHNER, J.P.
3294
KIRKPATRICK, J.R.
3474
KIRSNER, J.B.
3241*
KITAHARA, T.
3826
KJARTANNSSON, S.
3559
KLATSKIN, G.
3821
KLATTE, E.C.
3624
KLAUSNER, Y.S.
3206
KLEEB, M.
3121*
KLEIN, A.
3431*, 3468, 3661
KLEIN, H.J.
2964*
KLEIN, P.D.
3140
KLIGERMAN, M.M.
3551
KLIPPEL, C.H.
3825
KLUBES, P.
3228
KNAPP, A.
3259
KNAUS, W.A.
3910
KNEZEVIC, S.
3609
KNILL-JONES, R.P.
3631, 3703
KNOLL, J.
3042*
KOBAYASHI, S.
3348
KOCH, H.F.
3519
KOCH, M.
3207
KOCK, N.G.
3043*
KOELSCH, K.A.
3377
KOH, T.Y.

3032
KOHLER, J.J.
3431*, 3648*, 3661
KOHLER, P.
3751
KOHN, R.
3585
KOHNO, S.
3826
KOLODEJ, D.V.M.
3079*
KONDRUP, J.
3175
KONGTAHWORN, C.
3330
KONTUREK, S.J.
3084, 3111, 3128, 3379*
KOOP, C.E.
3522
KOPEL, F.B.
3632
KOPP, M.
3353
KORELITZ, B.I.
3484*
KORNER, K.
3809
KOROT'KO, G.F.
3098
KOROVNIKOV, K.A.
3157
KORZON, M.
3532
KOTELANSKI, B.
3785
KOTTKE, B.A.
3204
KOVACS, L.
2977
KOWAL-GIERCZAK, B.
3653
KOWALEWSKI, K.
3079*, 3097, 3162
KRAFT, A.R.
3252, 3343
KRAGELUND, E.
3384*, 3385*
KRAIN, L.S.
3553
KRAMER, G.
3377
KRANZ, D.
3188
KRASNA, I.H.
3880
KRATZER, G.L.
3587
KRAUSS, H.
3173
KREUZER, W.
3225
KRIPPAEHNE, W.W.
3558
KRISHNA, G.
3168
KRISTEWA, A.
3539
KROISS, A.
3227
KRONBORG, O.
3388*
KRONE, C.L.
3293, 3481
KRUSH, A.J.
3840
KUMAR, A.P.M.
3562
KUMAR, S.
3721
KUMAR, V.
3782
KUN, M.
3598
KUNISAKI, T.
3236*
KUNZE, H.
3022
KUPCHIK, H.Z.
3784, 3805
KURIYAMA, K.
3147
KURLAND, L.T.
3616
KUSAKARI, K.
3414
KWAK, K.S.
3269
KWIECIEN, N.
3379*
KYNER, J.
3671*
LABO, G.
3056
LABZOFFSKY, N.A.
3280
LACHOWICZ, K.
3863, 3864
LACOUR, J.
3848
LAFITTE, P.
3716
LAGNEAU, P.
3057
LAGUCHEV, S.S.
2994
LAKY, L.
3443
LAMBERT, C.
3662
LAMBERT, R.
3104
LAMBIOTTE, M.
2966, 3164
LANDA, L.
3237*
LANDER, J.J.
3740
LANE, N.
3542*
LANFRANCHI, G.A.
3056
LANGE, W.G.
3548
LANGER, B.
3815
LANYI, F.
3598
LAPIN, R.
3546
LAPLANE, R.
3278
LAPLANTE, M.
3786
LAPRESLE, J.
3887
LARRAIN, G.
3349
LASAGNA, L.
2998
LASKOWSKI, J.
3344
LATIPOVA, K.IU.
3098
LATKOWSKA, H.
2985
LAUBENTHAL, F.
3707*
LAURENCE, B.H.
3767
LAWS, J.W.
3829
LAZARUS, P.
3700
LAZECKI, L.
3344
LAZUKINA, L.N.
3891
LEBEDEVA, V.A.
3051
LEBEL, E.
3786
LECCHINI, S.
3582
LEE, C.S.
3546
LEE, P.W.R.
3449
LEE, S.
3107
LEE, S.W.
3208
LEHTONEN, A.
3489
LEINWEBER, B.
3172
LEMPINEN, M.
3153
LENIUSHKIN, A.I.
3452
LENNINGER, S.
3131
LEONESCU, M.
3770
LEONHARDT, W.
3158
LEONIDAS, J.C.
3880
LEPESANT, J.A.
3138
LERNER, K.G.
3672*
LEVER, J.V.
3526
LEVINE, W.G.

3143, 3144
LEVY, L.
3515
LEWIN, K.
3356*
LEWIN, M.
3835*
LEWIS, R.
3818
LIAIMAN, M.E.
3028
LICASTRO, R.
2967
LICHTENSTEIN, J.E.
3252
LIEBER, C.S.
3132*, 3186, 3789
LIEBERMAN, M.W.
3161
LIEHR, H.
3173, 3720
LIERSCH, M.E.A.
3170
LIFSON, N.
3007*
LILIBRIDGE, C.B.
3626
LILLEHEI, R.C.
3220, 3482
LILLY, J.
3820
LIMBOSCH, J.M.
2969
LINDELL, T.D.
3558
LINDNER, A.E.
3584
LINDQUIST, B.
3108
LINDSTRAND, K.
3130
LINNA, M.I.
3641
LINNEKE, P.
3700
LIPSCHULTZ, L.I.
3145
LIS, M.T.
3011*
LISBONA, R.
3300
LITWIN, S.D.
3436*
LIVOLSI, V.A.
3336
LLACER, A.
3312
LLAURADO-MIRET, E.
3893
LO GERFO, F.
3540*
LO GERFO, P.
3540*
LOBER, D.
3809
LOMAS, D.M.
3063
LONDON, W.T.
3731
LONGMIRE, W.P., JR.
3658
LOPEZ CORTES, M.
3535
LOPEZ GALLART, M.
3347, 3402
LOPEZ SANCHEZ, A.
3898
LORBER, S.H.
3004*
LORENTE MARTINEZ, A.
3630
LORENZ, J.
3653
LORENZO, G.A.
3493
LOSOWSKY, M.S.
3505*
LOSSNER, J.
3673*
LOTFI, M.
3916
LOUVARD, D.
2991
LOVE, A.H.G.
3002*, 3025
LUBBERS, E.J.C.
3453
LUCAS, C.E.
3368
LUCAS, J.
2978
LUDBROOK, J.
3239*
LUGARO, G.
2992
LUMSDEN, K.
3277
LUNA, L.
3520
LUNDELL, L.
3088
LUNDERQUIST, A.
3247*
LUNDGREN, O.
3214*
LURIE, B.
3250*
LUTHI, H.
3121*
LYNCH, H.T.
3840
MAAZ, E.
3255
MACAROL, V.
3137
MACCAIG, J.N.
3421
MACCALLUM, F.O.
3735
MACCULLOCH, M.J.
3523
MACIONUS, R.F.
3294
MACKAY, I.R.
3772
MACKENZIE, G.W.
3465
MACKMAN, S.
3268
MACKOWIAK, R.C.
3054
MACLEAN, L.D.
3333
MACQUET, V.
3716
MADDEN, D.L.
3740
MADER, M.
3207
MADJLESSI, S.H.
3491
MADSEN, P.
3388*
MAENHOUDT, R.
3564
MAGNIUS, L.O.
3729*
MAGNUS, I.A.
3791
MAGNUSSON, P.O.
3105
MAINGUET, P.
2982, 3512
MAIZZA, M.
3159
MAJERUS, P.W.
3672*
MAKHLOUF, G.M.
3229
MAKINO, S.
3694
MALAISSE, F.
3903
MALAMUD, D.
3136*
MALIK, T.K.
3915
MALIUGIN, E.F.
3187
MALLACH, H.J.
3779*
MALLEIN, R.
3787
MALLET-GUY, P.
3668
MALLORY, A.
3432*, 3483*
MALT, R.A.
3136*
MAMISTOV, V.A.
3862
MANELIS, G.
3365
MANERA, E.
2992
MANNS, J.J.
3656
MARCUSSEN, H.
3608*
MARECHAL, J.M.
3920
MARGULIES, M.
3274
MARKS, I.N.

3250*
MARKSCHEID-KASPI, L.
3012*
MARLISS, E.B.
3671*
MARMION, B.P.
3749
MAROUX, S.
2991
MARQUIE, G.
3017
MARRYATT, G.
3332
MARSDEN, N.V.B.
3076*
MARSHAK, R.H.
3584
MARTIN, A.
3308
MARTIN, F.F.
3433*
MARTIN, P.
3399
MARTIN, W.
3709*
MARTINEAU, G.
3820
MARTINEZ, D.
3637
MARTINI, G.A.
3115
MARX, F.W.
3612
MASHILOV, V.P.
3891
MASOOR, M.
3234*
MASUGI, Y.
3151
MATHE, D.
3181
MATHUR, T.N.
3914
MATINI, K.
3847
MATSANIOTIS, N.
3732
MATSUMOTO, T.
3409
MATTHEWS, A.W.
3244*
MATTHEWS, D.M.
3011*
MATZ, L.R.
3767
MAURER, G.
3622
MAURER, H.M.
3701*
MAVRIAS, D.A.
3191*, 3193*
MAXWELL, J.D.
3703
MAYCOCK, W.D.
3748
MAYER, R.J.
3191*, 3193*
MAYS, E.T.
3705
MAZUMDER, D.N.G.
3855
MAZURE, P.A.
3360
MAZZARIELLO, R.
3834
MAZZONI, G.
3159
MCANDREW, G.M.
3421
MCARDLE, A.H.
3221, 3647*
MCARTHUR, J.W.
3678
MCBRIDE, C.M.
3680
MCCAUGHAN, J.J., JR.
3601
MCCONATHY, W.J.
3246*
MCCORMICK, D.P.
3734
MCCRANIE, D.
3323
MCCULLY, D.J.
3763
MCDERMOTT, W.V., JR.
3798
MCDOUGAL, M.R.
3040*
MCDOWELL, W.
3271
MCFARLAND, S.A.
3060
MCGOVERN, V.J.
3311
MCGUIGAN, J.E.
3075*, 3357*
MCINTYRE, N.
3135*
MCKEE, A.P.
3299
MCKHANN, C.F.
3871
MCKINNA, J.A.
3580
MCLAUGHLIN, P.
3682
MCMICHAEL, H.B.
3261
MCMILLAN, R.B.
3421
MCMULLEN, C.T.
3795
MCNAMARA, J.J.
3380*
MCNEILL, C.J.
3543*
MCNEISH, A.S.
3507*
MCWHIRTER, J.D.
3838
MEADE, G.M.
3718
MEARNS MILNE, D.
3354
MEBAN, S.
3682
MEDALIE, J.H.
3427
MEDIN, S.
3885
MEEROFF, M.
3303, 3837
MEEUWISSE, G.
3247*, 3248*
MEHTA, L.
2995
MEHTA, S.K.
3514
MEI, N.
3055
MEIRRELLES, J.DE S., JR.
3418
MEISSNER, K.
3438
MELMED, R.N.
2996
MELTZER, S.S.
3675
MENDOZA, C.B., JR.
3410
MENG, C.H.
3831
MERCHANT, P.C.
3807
MESHKINPOUR, H.
3004*
MESSINGER, N.H.
3556
METZGER, A.L.
3240*
MEYER-BURG, J.
3314
MEYER, G.W.
3367
MEYER, J.H.
3597
MEYERS, M.A.
3273, 3473, 3475
MICHEAU, C.
3848
MICHEL, H.
3226
MIEDERER, S.E.
3392
MIENY, C.J.
3152
MIGLIOLI, M.
3056
MIGLIORELLI, F.A.
3334
MIGNON, M.
3071*
MILLER, D.L.
3851
MILLER, J.
3768
MILLER, L.R.
2965*
MILLER, R.E.
3291, 3846
MILLER, T.N.
3011*
MINEO, T.C.

3670
MINOCHA, S.K.
3799
MIR-MADJLESSI, S.H.
3683
MISTILIS, S.P.
3198*, 3249*
MITCHELL, C.G.
3768
MITRA, R.C.
3855
MIYA, T.S.
3155
MIYAGAWA, T.
3728*
MIYANO, T.
3826
MOAURO, L.
3508*
MODERNA, J.L.P.
3640
MODIGLIANI, R.
3026
MOHAN RAO, M.
3127
MOLLER, C.
3232*
MOLLIN, D.L.
3499
MOLOT, M.D.
3380*
MONFORT, R.
3401
MONGE, J.J.
3594
MONGES, H.
3055
MONTALBANO, M.E.
3049
MONTERO GARCIA, M.
3373
MONTGOMERY, J.L.
3795
MOODIE, A.D.
3536, 3537
MOORE, E.W.
3196*, 3866
MOORE, M.R.
3791
MOORE, T.
3784
MORAKE, J.
3152
MORALES, H.E.
3404
MORALES, J.O.
3238*
MORI, H.
3380*
MORITZ, M.
3004*, 3196*
MORL, M.
3778
MORLAND, A.
3338
MORLAND, J.
3134*
MORLOCK, C.G.
3665
MORRISSEY, J.F.
3292
MORSON, B.C.
3618
MOSBACH, E.H.
3182
MOSBECH, J.
3419
MOSER, C.A.
3218*
MOSES, H., III
3383*
MOSS, A.A.
3266
MOSTO, A.
3657
MOWAT, N.A.G.
3756
MRAOVITCH, S.
3207
MUGASHE, F.L.
3332
MUIR, R.W.
3563
MULLER, G.M.
3257
MULLER, O.
3841
MULLIGAN, T.O.
3457
MUNIZ GONZALES, J.
3313
MUNSON, F.A.
3480
MUNYARADZI, O.M.
3476
MURPHY, J.J.
3054, 3145
MURRAY-LYON, I.M.
3829
MURRAY, R.
3753
MUSI, L.
3062
MUTAFTSCHIEV, S.
2991
MUTCHLER, J.H.W.
3116*
MUTING, D.
3793*
MUTO, T.
3573
MYBURGH, J.A.
3152
MYHRE-JENSEN, O.
2988
MYREN, J.
3316
NADKARNI, S.V.
3915
NAFICY, K.
3664
NAGAO, F.
3295
NAGARAJU, M.
3737
NAGASHIMA, K.
3826
NAGORNA-STASIAK, B.
3201
NAITOH, T.
3064
NAJERA, M.E.
3639
NAKAGAWA, S.
3694
NAKAMURA, K.
3650*
NAKAYAMA, K.
3348
NASBETH, D.C.
3567
NATEGH, R.
3664
NAUDIN, G.
3663
NAVAB, F.
3011*
NAVARRETE, N.
3908
NAVARRO, J.
3278
NAYAK, N.C.
3806
NCUBE, L.
3152
NEBEL, O.T.
3243*, 3294
NEDKOWA-ERATANOWA, N.
3539
NELLANS, H.N.
3012*, 3015
NELSON, J.
3266
NELSON, J.A.
3033
NELSON, J.M.
3892
NELSON, K.
3006*
NELSON, R.
3507*
NEMUDZIVHADI, A.
3152
NERUP, J.
3608*
NESTERIN, M.F.
3028
NEU, H.C.
3708*
NEUBERGER, P.
3835*
NEUFELD, H.N.
3427
NEUPERT, A.
3715
NEWMAN, A.
3370
NEWMAN, H.
3370
NEWSOME, T.W.
3849
NEWSON, B.L.
3646*
NICE, C.M., JR.

3843
NICKEY, L.N.
3406
NICOLAS, J.P.
3092
NIELSEN, J.A.
3462
NIGRO, R.
3372
NIKITINA, L.V.
3157
NIKOLAEVA, M. IA.
3157
NIKOLOV, N.
3539
NILIUS, R.
3776, 3778
NILSSON, B.E.
3781
NILSSON, F.
3039*
NILSSON, R.
3139
NIMMO, J.
3030
NINO, R.
3904
NIWA, M.
3243*
NJAI, D.M.
3122*
NOBREGA, F.T.
3616, 3665
NOGUEIRA, J.F.
3666
NOLL, B.W.
3142
NORDEN, A.
3509*
NORDSTROM, C.
3190*
NORMAN, A.W.
3203
NORRYD, C.
3247*
NORRYD, G.
3248*
NORTON, L.W.
3381*
NORTCN, R.A.
3267
NORUM, M.L.
3783
NOVIS, B.
3250*
NOWORYTA, J.
3865
NOWOTNY, K.
3355
NYHUS, L.M.
3414, 3646*
O'BRIEN, J.A.
3464
O'BRIEN, P.
3216*
O'CONNELL, J.R.
3145
O'HARA, A.E.
3320
O'MOORE, R.R.L.
3194*
O'SULLIVAN, J.N.
3665
OBIGLIC, H.
3841
OBTULOWICZ, W.
3111
OCHS, H.D.
3487*
OCKNER, R.K.
3198*
ODIEVRE, M.
3525
ODLING-SMEE, G.W.
3413
OGAWA, N.
3151
OGOSHI, K.
3243*
OH, W.
3758
CHNISHI, H.
3151
OKUDA, K.
3236*
OLD, L., JR.
3833
OLEJNIK, Z.
3902
OLIN, T.
3131
OLSEN, H.
3660
OLSEN, W.A.
3518
OLSEN, W.R.
3235*
OLSSCN, R.
3702
OMOLE, A.A.
3100
ONSANIT, T.
3587
ONTKO, J.A.
3141
OPPENHEIMER, J.H.
3183
ORAHOOD, R.C.
3073*
ORDA, R.
3472
ORDNUNG, W.
3793*
ORLOFF, M.J.
3107
ORMAS, P.
3065
ORON, D.
3427
ORSZULCK, J.
3413
ORTIZ DE LANCAZURI, E.
3774
OSNES, J.B.
3134*
OSTROVERKHOV, G.E.
3187
OSUCH, T.
3902
OSUGA, T.
3179
OTTENI, F.
3468, 3469
OTTO, H.F.
3524
OTTO, L.
3778
PACKER, L.
3160
PADILLA, A.J.
3495
PAGLIERO, K.M.
3340
PAIT, C.F.
3739
PAJNO-FERRARA, F.
3122*
PALASCIANO, G.
3185
PALAYEW, M.J.
3454
PANDIT, P.N.
3549
PANOUSE-PERRIN, J.
3759
PAPIERNIK, M.
3521
PAPP, G.
3777
PAPP, M.
3669
PARAN, M.
3226
PARASHAR, S.K.
3915
PARIS, F.
3346
PARIS, M.
3561
PARODI, H.
3360
PARODI, H.C.
3125
PARRISH, R.A.
3877
PARTINGTON, P.F.
3832
PASSARO, E., JR.
3450, 3866
PASTA, P.
2992
PASTORE, R.
3049
PASTORE, R.A.
3337
PATRASSI, N.
3253, 3670
PATRICK, J.W.
3492
PATRICK, R.
3766
PATRINA, V.G.
3625
PATTERSON, H.C.

3816
PATTERSON, M.
3296
PAUL, R.E., JR.
3267
PAULET, P.
3478, 3479
PAULOWITZ, H.P.
3227
PAULSON, D.L.
3325
PAYAN, H.
3650*
PEARSE, A.G.E.
2968
PEDINI, G.
3307
PEFFERS, A.S.R.
3886
PELON, W.
3738
PELOQUIN, A.B.
3577
PENA, A.S.
3366
PENA, J.
3802
PENN, D.
3547
PENNEY, D.P.
2998
PERA MADRAZO, C.
3895
PERCY-ROBB, I.W.
3194*
PEREDERI, L.
3770
PEREZ GUZMAN, E.
3898
PEREZ MIRANDA, M.
3774
PERHEENTUPA, J.
3695
PERLSTEIN, T.
3427
PERRINE, R.P.
3812
PERROTTA, G.
3670
PERROTTO, J.
3006*
PESTEL, M.
3662
PETER, F.
3759
PETERSEN, H.
3316
PETERSON, E.
3139
PETERSON, M.R.
3753
PETIT, P.
3730*
PETUKHOV, I.A.
3884
PETZOLD, H.
3378, 3715
PFAFFMAN, M.A.
3060
PHILP, J.R.
3739
PIEKARSKA, T.
2986
PIERCE, N.F.
3855
PILSTROM, L.
3176
PITKEVICH, E.S.
3884
PIULACHS, P.
3893
PIULACHS, X.
3893
PLAA, G.L.
3704
PLAINFOSSE, B.
3521
PLATT, N.
3498
POEMAPE, O.
3529
POKROVSKII, A.A.
3157
POKROVSKII, V.I.
3891
POLAK, J.
2968
POLEY, J.R.
3246*
POLLACK, W.
3299
POLLARD, H.M.
3407
POLONOVSKI, C.
3278
PONKA, J.L.
3824
PONS ROMERO, F.
3774
PONTES, J.F.
3418
POPESCU, C.
3341
POPESCU, S.
3101
POPOV, E.A.
3625
POPS, M.A.
3502*
PORTA, E.A.
3186
PORTER, P.
2980
PORTMAN, O.W.
3179
POSTLETHWAIT, R.W.
3417
POTICHA, S.M.
3493, 3844
POTTEN, C.S.
2977
POWELL, L.W.
3800
PRAKASH, A.
3549
PREISIG, R.
3137
PRENTICE, R.S.A.
3283
PRESCOTT, L.F.
3030
PRESENT, D.H.
3484*
PRIEST, R.J.
3297
PRINTEN, K.J.
3823
PROLLA, J.C.
3241*
PROVIDO, H.S.
3146
PURCELL, R.H.
3740
PURTILO, D.T.
3265
QUAN, S.H.Q.
3541*, 3578
QUINBY, W.C.
3678
RABINOWITZ, A.D.
3228
RACHLIN, L.
3411
RADECKI, T.
3128, 3379*
RADMANOVIC, B.Z.
3046
RADU, D.
3619
RADYMSKA-WAWRZYNIAK, K.
3201
RAEZER, D.M.
3145
RAFFENSPERGER, J.G.
3679
RAGAZZINI, F.
3731
RAGHURAMULU, N.
3528
RAGINS, H.
3831
RAINE, A.E.G.
3163
RAJPAL, S.G.
3474
RAMALINGASWAMI, V.
3782, 3806
RAMPONE, A.J.
3009*, 3199*
RAMSEY, D.H.
3021
RAO, G.S.
3209, 3210
RAO, M.L.
3209, 3210
RAPTIS, S.
3354
RASCHE, R.
3416
RASMUSSEN, K.
3317
RAVITCH, M.M.
3451
RAWAT, A.K.

3147
RAZIG, S.A.D.
3095
REA, W.J.
3329
READ, A.E.
3421, 3574, 3592
READ, R.C.
3424
REDEKER, A.
3299
REED, S.E.
3851
REED, W.D.
3727, 3768
REEDER, D.D.
3077*
REGGIO, H.
3117*
REGY, M.
3308
REHBOCK, G.
3022
REHFELD, J.F.
2990
REID, I.M.
2974
REID, W.D.
3168, 3857
REIKOWSKI, J.
3793*
REIS, B.A.
3187
REISINGER, L.
3000
REISS, A.M.
3678
REISSMANN, K.
3258
REMINE, W.H.
3459
RENGER, F.
3256, 3792
REY, F.
3508*
REY, J.
3027, 3508*, 3525
RICCITELLI, M.L.
3634
RICH, R.R.
3726
RICHARDS, A.B.
3645
RICHARDSON, J.D.
3213
RICHARDSON, R.S.
3381*
RICHTER, E.
3720
RICKERS, J.
3709*
RICOUR, C.
3027
RIDDLE, J.M.
3368
RIDOLFO, A.S.
3860
RIFAT, H.
3546
RIIS, P.
3614
RILEY, R.M.
2976
RIMSTEN, A.
3108
RINALDO, J.A., JR.
3458
RIPPIN, A.
3472
RISS, E.
3427
RITMAN, S.
3758
RITTENBERRY, A.
3674
RITTER, L.
3598
RIVERA-CALIMLIM, L.
2998
RIVERA, R.A.
3272
RIVERO FONTAN, J.L.
3400
ROBB, J.D.A.
3413
ROBBINS, A.H.
3267
ROBERTSON, J.S.
3757
RODKEY, G.V.
3586
RODRIGO MUNOZ, J.
3237*
RODRIGUEZ CUARTERO, A.
3373
RODRIGUEZ GARAY, E.
3013
ROESCH, C.B.
3467
ROGEAUX, Y.
3716
ROGERS, J.V.
3492
ROGERS, L.S.
3814
ROGOS, R.
3378
ROHDE, J.E.
3002*
ROMIEU, C.
3226
ROMMEL, K.
3262
RONAI, P.M.
3239*
ROPKE, C.
3488*
ROSE, A.S., III
3658
ROSE, R.C.
3012*
ROSEN, H.
3107
ROSEN, P.P.
3541*
ROSENAK, B.D.
3291
ROSENBERG, B.F.
3368
ROSENBERG, M.A.
3490
ROSENTHALL, L.
3300
ROSS, F.G.M.
3244*
ROSSI, N.P.
3330
ROSSIGNOL, J.M.
3138
ROST, R.
3173
ROTH, R.P.
3068
ROTTER, S.
3172
ROWBOTHAM, H.D.
3580
ROWE, J.S., JR.
3375
ROWE, M.I.
3024
ROWLAND, A.J.
3746
ROY, C.C.
3246*
ROZE, C.
3057
RUBENSTEIN, D.
3851
RUBIN, A.
3860
RUBIN, W.
3358*
RUBIO GALLI, O.A.
3629
RUDICK, J.
3118*
RUEBNER, B.H.
3133*
RUET, D.
3104
RUIZ, J.O.
3220, 3482
RUNE, S.J.
3112, 3288, 3393
RUPPERT, C.
3285
RUSH, B.F., JR.
3215*
RUSSELL, R.I.
3766
RUSSFIELD, A.B.
3678
RUTTER, K.R.P.
3573
RYAN, J.A.
3613
RYKOV, V.I.
3187
SACHAR, D.B.
3484*
SACHDEVA, H.S.
3572
SACK, G.H., JR.

3855
SACK, R.B.
3855
SACKLER, J.P.
3444
SAFAIE-SHIRAZI, S.
3823, 3842
SAHA, S.P.
3467
SAIBIL, E.
3454
SAID, S.I.
3206
SAITO, S.
3295
SAKAI, K.
3264
SAKIYALAK, P.
3814
SALAS, S.J.
3535
SALDUCCI, J.
3055
SALES, J.E.L.
3381*
SALGANIK, R.I.
3109
SALMI, H.J.
3620*
SALMON, P.R.
3574
SALSBURY, A.J.
3580
SAMA, S.K.
3799
SANANES, L.
3036
SANCHEZ DE LA CUESTA, F.
3401
SANDERS, L.L.
3424
SANFILIPPO, J.A.
3565
SARDESAI, V.M.
3146
SARLES, H.
3185, 3650*, 3803
SARMA, D.S.R.
2973, 2974
SATO, M.
3264
SAUER, W.G.
3576, 3616
SAUNDERS, R.N.
3218*
SAVAGE, D.
3483*
SAVAGE, D.C.
3432*
SAVANAT, T.
3275
SAWOW, G.
3539
SAWYERS, J.L.
3817
SCHAFER, D.F.
3177
SCHANNE, O.F.
3029
SCHARF, R.
3097
SCHATZKI, P.
3319
SCHELINE, R.R.
3231
SCHENK, W.G., JR.
3225
SCHENTKE, U.
3256
SCHILLER, W.R.
3116*
SCHIMMEL, E.M.
3267
SCHINELLA, R.A.
3706
SCHJONSBY, H.
3510*
SCHMIDT, H.A.
3115
SCHMITZ, J.
3525
SCHNAUFER, L.
3562, 3595
SCHNEIDER, G.
3188
SCHNUR, P.
3459
SCHOLZ, N.E.
3291
SCHONAUER, M.
3372
SCHULTZ, L.S.
3220
SCHULTZ, S.G.
3012*, 3015
SCHUMACHER, R.
3209, 3210
SCHUMAN, B.M.
3297
SCHWARTZ, S.S.
3581
SCHWARZ, F.J.
3037
SCIMONE, G.
3310
SCOTT, R.A.P.
3449
SEABROOK, M.L.
3102
SEAGRAM, G.
3024
SEAL, S.H.
3579
SEBASTIA VILA, J.L.
3347, 3402
SECHTER, I.
3875
SEDLACK, R.E.
3616
SEELY, R.J.
3014
SEGERSTROM, A.
3038*, 3039*
SEGLEN, P.O.
3134*
SEHDEV, M.K.
3579
SEHGAL, A.K.
3605*
SEHGAL, V.N.
3721
SEIDEL, D.
3246*, 3285
SELHUB, J.
3195*
SELIGER, G.
3545
SEMB, L.S.
3082, 3083
SEPPALA, P.O.
3489
SEPPALAINEN, A.M.
3725
SERINGE, P.
3521
SERMAN, D.
3096
SERRANI, R.E.
3013
SERROU, B.
3226
SEVER, J.L.
3740
SHAFFNER, L.D.
3628
SHAKER, I.J.
3599
SHALYGINA, N.B.
3891
SHAMOV, I.A.
3881
SHANNON, M.P.
3857
SHARIATZADEH, A.N.
3624
SHARMA, G.C.
3550, 3906
SHARMA, L.K.
3549
SHARMA, M.P.
3549
SHARMA, N.N.
3298
SHARP, D.S.
3045
SHAW, A.
3870
SHEAHAN, D.G.
3581
SHEARD, A.V.
3757
SHEARMAN, D.J.C.
3233*
SHERLOCK, S.
3741, 3827
SHERMAN, F.E.
3451
SHIBATA, S.
3050
SHIELDS, T.W.
3352, 3566
SHIFF, A.D.
3581
SHILKIN, K.B.

3829
SHIMOKAWA, Y.
3236*
SHINER, M.
3506*
SHINOZAKI, K.
3694
SHINYA, H.
3595
SHKOLNIK, A.A.
3679
SHOOK, C.D.
3845
SHORTER, R.G.
3610
SHUL'TSEV, G.P.
3625
SHULMAN, N.R.
3753
SHUMWAY, C.N.
3701*
SIAURUSAITIS, B.IU.
3883
SICARD, J.P.
3887
SICHUK, G.
3436*
SIDRANSKY, H.
2973, 2974
SIEGEL, M.
3672*
SIEMSSEN, S.
3524
SIFFERT, G., JR.
3913
SILEN, W.
3216*
SILL, V.
3524
SILTANEN, E.
3725
SILVA, E.
3260
SILVIDI, A.A.
3637
SIMELL, O.
3695
SIMI, M.
3253
SIMITHRAARATCHY, C.
3589
SIMON, J.L.
3351
SINGER, R.W.
3144
SINGH, M.
3806
SINZINGER, H.
3000
SJOBERG, N.O.
3105
SKAWINSKA, Z.
3309
SKILLMAN, J.
3471
SKONE, J.F.
3746
SKOV-JENSEN, A.
3105
SKREB, N.
3096
SLAVIN, A.
3687
SLAVIN, S.
3617
SLAVOTINEK, A.H.
3239*
SLEGERS, J.F.G.
3016
SLOSS, B.S.
3847
SMALLWOOD, C.J.
3107
SMITH, A.J.
3851
SMITH, C.L.
3505*
SMITH, E.B.
3890
SMITH, G.W.
3276
SMITH, J.
3483*
SMITH, J.R.
3717
SMITH L.
3160
SMITH, M.E.
3001*
SMITH, M.G.M.
3768
SMITH, R.
3644
SMITH, R.B.
3384*, 3385*
SMOLIANSKII, B.L.
3099
SOCHA, J.
3530
SOERGEL, K.H.
3516, 3867
SOININEN, K.
3620*
SOLASSOL, C.
3226
SOLEIM, H.A.
3231
SOLOMON, A.
3896
SOMASUNDARAM, K.
3819
SOMEYA, N.
3236*
SORENSEN, T.
3390
SORRELL, M.F.
3177
SOSIN, H.
3645
SOSNIK, H.
3531
SOWA, J.
3309
SOYER, T.
3153
SPANOS, P.
3636
SPARBERG, M.
3495
SPARKS, R.D.
3271
SPENCER, R.J.
3610
SPENCER, R.P.
3289
SPIELVOGEL, A.M.
3203
SPIRO, H.M.
3615
ST. CLAIR, W.R.
3465
STADELMANN, O.
3392
STAHLGREN, L.H.
3412
STAMFORD, I.F.
3078*
STAMLER, B.
3365
STARZL, T.E.
3685, 3820
STEARNS, M.W., JR.
3579
STEFENELLI, N.
2984
STEINITZ, H.
3911
STEPHENS, E.F., JR.
3371
STEPHENS, F.D.
3279
STERN, H.
3750
STERN, R.B.
3631, 3703
STERUP, K.
3419
STEWART, D.
3688
STICKLER, G.B.
3576
STIRLING, G.A.
3742
STITZEL, R.E.
3154
STOCK, C.
3123*
STOCKS, A.E.
3800
STOEBNER, P.
3123*
STOKES, T.L.
3833
STOLBACH, L.
3471
STOLINSKI, C.
2997
STOLTE, M.
3392
STONE, H.H.
3627
STONE, R.M.
3815
STONE, R.S.

3739
STONE, R.T.
3858
STOPPOLONI, G.
3696
STORY, J.
3889
STOTZNER, H.
3792
STRAKELE, H.
2993
STRASSBURG, G.
3188
STREBEL, H.
3137
STREMPLE, J.F.
3380*
STRICKLAND, R.G.
3356*
STUART, M.
3568
STURGEON, P.
3269
STURGES, H.F.
3293, 3481
STYPULKOWSKA-MISIUREWICZ, H.
3863, 3864
SUAREZ GARCIA, A.
3630
SUAREZ, J.R.E.
3081
SUBBIAH, M.T.R.
3204
SUGARMAN, H.J.
3267
SUGAWA, C.
3368
SUGG, W.L.
3329
SUMERLING, M.D.
3233*
SUMMERSKILL, W.H.J.
3504*, 3684
SUNDIN, T.
3043*
SUNDQVIST, K.G.
3686
SUPRUN, H.
3365
SURIYAPA, C.
3116*
SURUGA, K.
3826
SUSOR, W.A.
3164
SUTNICK, A.I.
3731
SUZUKI, H.
3295, 3348, 3562, 3599
SUZUKI, K.
3151
SUZUKI, T.
3905
SVENSSON, S.E.
3088
SVENSSON, S.O.
3090, 3113
SVIRCEVIC, A.
3342
SWENSON, O.
3679
SWERDLOW, D.B.
3588
SZCZPANSKI, M.M.
3332
TABAQCHALI, S.
3510*
TAFT, D.A.
3615
TAKAGI, K.
3053
TAKAYANAGI, I.
3053
TALANS, S.
3418
TAMAKI, Y.
3405
TAN, K.K.
3775, 3790
TANDON, B.N.
3799
TANEJA, O.P.
3643
TANSY, M.F.
3054, 3068, 3102
TARAZONA, V.
3346
TASCHEV, T.
3539
TASLER, J.
3111
TAUB, R.N.
3484*
TAVELA, K.
3232*
TAYLOR, B.R.
3815
TAYLOR, K.B.
3356*
TAYLOR, L.H.
3555
TAYLOR, P.E.
3281
TEAGUE, R.H.
3574
TEALE, J.D.
3025
TEATOR, D.M.N.
3918
TELATAR, H.
3714
TERRY, D.B., JR.
3395
TEXTER, E.C., JR.
3350
THAYSEN, E.H.
3462
THEOLEYRE, J.
3920
THIEL, H.
3173
THILLIER, J.L.
3308
THIPUMALAI, C.
3005*
THOMAS, E.
3464
THOMAS, E.D.
3672*
THOMAS, H.F.
3075*
THOMAS, M.
3469
THOMAS, M.L.
3583
THOMAS, P.J.
3501*
THOMAS, P.S.
3413
THOMASSON, B.
3641
THOMPSON, A.G.
3107
THOMPSON, J.C.
3077*
THOMPSON, R.P.H.
3703
THOMPSON, W.G.
3682, 3762
THOMSPON, A.G.
3647*
THOR, P.
3128, 3379*
THORLAKSON, R.H.
3466
THORPE, C.D.
3235*
THYS, O.
3148, 3149
TISCORNIA, O.
3185
TOCCALINO, H.
2967, 3904
TODD, I.P.
3570
TOEWS, C.G.
3671*
TOFT, J.
3188
TOLL, G.D.
3678
TOMAS, J.G.
3267
TOMAS, M.
3312
TOMIYAMA, A.
3053
TOMPKINS, R.K.
3252, 3612
TONKIN, R.W.
3749
TORRES, P.
3908
TORRES-PINEDO, R.
3003*
TOSKES, P.P.
3503*, 3642
TOTHILL, P.
3030
TOVEE, E.B.
3815
TOWNES, A.S.
3755
TOWNES, P.L.

3626
TOWNLEY, R.R.W.
3500*
TRAN, N.
3786
TRANBERG, K.G.
3234*, 3247*, 3248*, 3318
TRENCKMANN, H.
3258
TRENTI, A.
3603
TRIPODI, D.
3299
TROSHKOV, A.A.
3883
TRUBSBACH, A.
3158, 3256
TRUDEAU, W.L.
3357*
TRUELOVE, S.C.
3366
TSAO, M.
3133*
TSOLAKIDIS, P.
3580
TSUJIMOTO, K.
3451
TSUKUDA, S.
3151
TUDOR, V.
3315
TUIT, G.
2971
TULCINSKY, D.B.
3876
TUMA, D.J.
3177
TURELL, R.
3575
TURNBULL, A.L.
3791
TURNER, G.C.
3752
TURNER, M.D.
3126
TUROLLA, E.
3307
TYAGI, S.P.
3721
TYE, C.Y.
3775, 3790
TYOR, M.P.
3433*
TYRRELL, D.A.J.
3851
UDOVICKI, J.
3342
UHLIG, K.
3188
UJIKI, G.T.
3566
ULLMANN, H.L.
3170
UNDERWOOD, J.C.E.
3689
UNGER, W.G.
3078*
URBANO JIMENEZ, F.
3373
URIBE, P.
3349
VACHON, A.
3667
VADHANASINDHU, P.
3124
VALENCIA-PARPARCEN, J.
3364
VALLI, A.
3159
VALTUENA, J.P.
3263
VAN DER HOEDEN, R.
3391
VAN DER SCHUEREN, G.
3564
VAN KRUININGEN, H.J.
3494
VAN OS, C.H.
3016
VAN VROONHOVEN, T.J.
3136*
VAN WAY, C.W., III
3817
VAN WYK, J.
3820
VAN ZWIETEN, P.A.
3093
VANDAMME, J.
3564
VANDAMME, J.P.
3564
VANSTEENKISTE, Y.
2969
VARELA, P.
3271
VARMA, F.K.
3279
VARMI, R.A.
3915
VARRO, V.
3071*
VASERIN, IU. I.
3761
VATIER, J.
3071*
VEALL, N.
3002*
VEDRENNE, C.
3888
VEECH, R.L.
3165
VELASCO RAYO, M.
3780
VELOSO, D.
3165
VERBANCK, M.
3391
VERNEY, E.
2973, 2974
VETTEN, B.
3152
VIAMONTE, M.
3475
VICKERS, P.
3906
VIDAL COLOMER, E.
3447
VIDONE, R.
3551
VIERUCCI, A.
3731
VIKKULA, E.
3725
VILJANTO, J.
3489, 3641
VILLAREJOS, V.M.
3738
VILLEGAS, L.
3036
VILSECK, J.
3433*
VIRIYANOND, P.
3275
VISAKORPI, J.K.
3695
VISALAKSHI, S.
3806
VITERI, F.E.
3517
VIZI, S.E.
3042*
VOGT, W.
3022
VOICU, F.
3443
VOICU, L.
3443
VOITK, A.
3647*
VOLK, H.
3557
VON PARIS, V.
3751
VORBRODT, A.
2966
WADUD, A.
3723
WAGNER, G.
3515
WAISMAN, R.
3360
WALKER, B.E.
3505*
WALKER, J.H.
3615
WALKER-SMITH, J.
2989, 3463
WALKER, W.
3756
WALLACE, S.
3680
WALSH, J.H.
3386*, 3866
WALT, A.J.
3368
WALTERS, T.R.
3519
WAPNICK, S.
3476
WARD, C.O.
3180
WARREN, K.S.
3917
WARREN, K.W.

3822
WARWICK, R.R.G.
3233*
WATKINSON, G.
3421
WATSON, C.J.
3801
WATSON, R.C.
3900
WATSON, T.
3496
WAY, L.W.
3074*
WAYNE, E.R.
3363
WEBB, W.R.
3814
WEBER, A.
3246*
WEBSTER, K.H.
3684
WEEDON, D.
3610
WEEMS, H.S.
3492
WEILL, J.P.
3648*
WEINBERGER, M.
3024
WEINBREN, K.
3742
WEINSTEIN, L.D.
3879
WEINSTEIN, M.H.
3612
WEISE, H.
3673*
WEISS, J.J.
3407
WEISS, O.
3552
WEISS, R.
3154
WEITZMAN, S.
3737
WELLING, R.E.
3798
WELLS, R.F.
3543*
WELLWOOD, J.M.
3583
WENZEL, R.
3912
WENZEL, R.P.
3734
WESTESSON, A.K.
3130
WESTLIN, N.E.
3781
WESTPHAL, O.
3885
WHALEN, J.P.
3473, 3475
WHARTON, J.T.
3717
WHEATLEY, D.N.
2979
WHELAN, T.J., JR.
3797
WHELTON, M.J.
3693
WHITAKER, W.
3338
WHITAKER, W.G., JR.
3375
WHITCOMB, F.W., JR.
3822
WHITE, J.J.
3562, 3599
WHITE, P.H.
3638
WHITE, R.R., III
3639
WHITE, T.T.
3376, 3659
WHITEHEAD, R.
3366
WIG, N.N.
3514
WIGGINS, H.S.
3497
WIJESUNDERA, S.
3167
WILDHIRT, E.
3719
WILKINSON, A.R.
3384*, 3385*
WILLEMS, G.
2969, 2983
WILLGERODT, H.
3673*
WILLIAMS, C.
3573
WILLIAMS, G.C.
3140
WILLIAMS, J.W.
3674
WILLIAMS, M.
2967
WILLIAMS, R.
3631, 3688, 3703, 3727,
3754, 3768, 3829
WILLROTH, P.O.
3654
WILLS, C.E., JR.
3456
WILLS, E.D.
3166
WILLSON, R.A.
3684
WILSON, C.
3280
WILSON, I.D.
3871
WILSON, J.A.C.
3420
WINISDORFER, G.
3648*
WINSHIP, D.H.
3087
WISEMAN, C.W.
3222
WISEMAN, N.
3466
WISNIEWSKI, K.
2986
WITSCHI, H.
3161
WITSCHI, N.
3704
WITTEN, T.A.
3242*
WITTMANN, W.
3537
WIZNITZER, T.
3472
WOHL, G.T.
3274
WOJNAR, A.
3653
WOLF, G.
3254
WOLFE, D.L.
3034
WOLFF, R.
3092
WOLFF, W.I.
3595
WOLFSTEIN, I.
3876
WOLLOCH, Y.
3839
WONG, W.C.
2981
WOOD, D.E.
3301
WOOD, M.
3396
WRIGHT, R.
3764
WU, J.P.
3268
WULFF, H.R.
3614
XAVIER, R.G.
3241*
YAJIMA, G.
3151
YALOW, R.S.
3290
YAMAMOTO, M.
3264
YAMASAKI, M.
3264, 3361
YANNAKOS, D.
3873
YASUMOTO, M.
3236*
YODFAT, Y.
3428
YOFE, J.
3875
YUNIS, E.J.
3265
ZALAN, E.
3280
ZAMCHECK, N.
3784, 3805
ZANGL, A.
3438
ZARAGOSI MOLINER, J.
3923
ZARAPICO, M.
3810

ZAVALA, J.
3535
ZAVERI, M.P.
3807
ZBORALSKE, F.F.
3230
ZEOLITE, C.
3081
ZER, M.
3681, 3839
ZIKRIA, B.A.
3708*
ZILLER, S.A., JR.
3142
ZIMMERMAN, E.
3252
ZIMMERMAN, G.
3227
ZIMNY, M.
3430*
ZIMONINA, T.V.
3109
ZIPPRICH, B.
3778
ZIVIELLO, M.
3310
ZIVONOVIC, M.
3342
ZLOTNICK, A.
3687
ZOLLINGER, R.M.
3252
ZOPPI, G.
3122*
ZUCKERMAN, A.J.
3744
ZUCKERMAN, L.
3383*
ZURLI, J.
3803

SUBJECT INDEX

NUMBERS FOLLOWED BY AN ASTERISK INDICATE ABSTRACTS. OTHER NUMBERS REFER TO CITATIONS.

- ABDOMEN
  - ABSCESS
    - EPIDEMIOLOGY, 3845

- ABDOMEN, ACUTE
  - CHILDREN
    - RADIOLOGY, 3873
  - DIAGNOSIS
    - ANGIOGRAPHY, 3235*

- ABSCESS
  - ABDOMEN
    - EPIDEMIOLOGY, 3845
  - ANUS, 3558
  - LIVER, 3708*, 3921
    - AMEBIASIS, 3915
    - ENTERITIS, 3682
    - NEONATE, 3674
    - SCANNING, SCINTILLATION, 3237*, 3239*
  - RECTUM, 3558
  - RETROPERITONEAL
    - PEPTIC ULCER, 3395

- ABSORPTION
  - ALCOHOLS, POLYHYDRIC
    - APPENDIX, 3007*
  - AMINO ACIDS
    - SMALL INTESTINE, 3011*
  - ANALGESICS
    - MOTILITY, 3030
  - ANTICOAGULANTS
    - JEJUNUM, 3032
  - BILIRUBIN
    - JEJUNUM, 3013
  - CHOLESTEROL
    - BILE, 3009*
    - EMULSIFYING AGENTS, 3009*
    - SMALL INTESTINE, 3009*
  - CONTRAST MEDIA
    - BILIARY TRACT, 3033
  - COPPER
    - SMALL INTESTINE, 3037
  - ELECTROLYTE
    - APPENDIX, 3007*
  - ENDOTOXIN
    - SHOCK, 3019
  - FATTY ACIDS
    - BILE ACIDS, 3199*
    - SMALL INTESTINE, 3199*
  - FOLIC ACID
    - JEJUNUM, 3001*
    - SMALL INTESTINE, 3195*
  - GASTROINTESTINAL
    - TECHNIQUES, 3018
  - GLUCOSE
    - DRUG EFFECTS ON, 3025
    - JEJUNUM, 3025
    - SMALL INTESTINE, 3006*
  - INSULIN
    - SMALL INTESTINE, 3028
  - INTESTINE
    - CATECHOLAMINES, 2998
  - JEJUNUM
    - DRUG EFFECTS ON, 3022
  - LIPIDS
    - DRUG EFFECTS ON, 3017
    - GASTRECTOMY, 3405
    - MALNUTRITION, 3517
    - REVIEWS, 3027
  - PANCREAS
    - CIRCULATION, 3116*
    - LYMPHATICS, 3116*
  - PEPTIDES
    - SMALL INTESTINE, 3011*
  - SMALL INTESTINE
    - GLUCOSE, 3026
    - HORMONE EFFECTS ON, 3021
    - INHIBITION, 3015
  - SODIUM
    - AMINO ACIDS, 3005*
    - ILEUM, 3008*
    - PEPTIDES, 3005*
  - STOMACH
    - ASPIRIN, 3076*
    - SUGARS, 3076*
  - SUGAR
    - DIETARY FACTORS, 3191*, 3193*
    - MALNUTRITION, 3517
    - SMALL INTESTINE, 3191*, 3193*
    - TECHNIQUES, 3247*, 3248*
  - TRACE ELEMENT
    - DIETARY FACTORS, 3014
  - VITAMIN B12
    - BLIND LOOP SYNDROME, 3510*
    - CORTICOSTEROIDS, 3356*
    - MALNUTRITION, 3517
  - WATER
    - AMINO ACIDS, 3005*
    - CHOLECYSTOKININ, 3004*
    - GALLBLADDER, 3016
    - PEPTIDES, 3005*
    - SECRETION, 3004*

- ACETYLCHOLINE
  - ILEUM
    - MOTILITY, 3042*
  - JEJUNUM
    - ELECTROPHYSIOLOGY, 3048

- ACHALASIA
  - ESOPHAGUS
    - VARICES, 3343

- ACHLORHYDRIA
  - SEE ALSO ACID SECRETION

- ACID
  - INJURY
    - CHEMICAL BURNS, 3889

- ACID PHOSPHATASE
  - SEE PHOSPHATASE, ACID

- ACID SECRETION
  - SEE ALSO ACHLORHYDRIA
  - SEE ALSO HYPERCHLORHYDRIA
  - SEE ALSO HYPOCHLORHYDRIA
  - DUODENUM
    - TRIGLYCERIDE, 3074*
    - ULCER, 3386*
  - ESOPHAGITIS
    - ETIOLOGY, 3332
  - ESOPHAGUS
    - TRAUMA, 3104

- LYMPH
  - GASTRIN, 3077*
- PEPTIC ULCER
  - HORMONE EFFECTS ON, 3379*
  - MORPHOLOGY, 3392
  - PEPSINOGEN, 3392
- STOMACH
  - ACIDITY, 3072*
  - ANTICOAGULANTS, 3083
  - ANTRECTOMY, 3073*
  - ASPIRIN, 3076*, 3108, 3362
  - CHOLECYSTOKININ, 3074*
  - CHOLINERGIC AGENTS, 3093
  - CIRCULATION, 3089
  - CIRRHOSIS, 3115
  - 2-DEOXY-D-GLUCOSE, 3071*, 3073*
  - DIURETICS, 3404
  - DRUG EFFECTS ON, 3086, 3089
  - GASTRECTOMY, 3405
  - GASTRIN, 3075*
  - GASTRONE, 3082
  - GLUCAGON, 3106
  - HORMONE EFFECTS ON, 3111
  - HYPERCHLORHYDRIA, 3360
  - HYPOXIA, 3081
  - INHIBITION, 3070*, 3083
  - INSULIN, 3385*
  - LYMPHATICS, 3077*
  - NERVOUS CONTROL, 3114
  - NUCLEOTIDES, 3110
  - PANCREATECTOMY, 3124
  - PENTAGASTRIN, 3073*, 3109
  - PEPTIC ULCER, 3386*
  - PROSTAGLANDIN, 3078*
  - PYLOROPLASTY, 3388*
  - REVIEWS, 3114
  - SALIVA, 3112
  - SECRETION, 3088
  - TECHNIQUES, 3090, 3113
  - TRANSPLANTATION, 3107
  - TRAUMA, 3104
  - TRIGLYCERIDE, 3074*
  - VAGOTOMY, 3384*, 3385*, 3388*

ACIDITY
- CHEMORECEPTION
  - KINETICS, 3229
- DUODENUM
  - SECRETION, 3288
- LIVER
  - PERFUSION, 3134*
- STOMACH
  - ACID SECRETION, 3072*
  - CHOLERA, 3855
  - DIARRHEA, 3855
  - MUCOSA, 3087
  - RADIOTELEMETRY, 3105
  - SECRETION, 3085

ACIDOSIS
- AMINO ACIDS
  - METABOLISM, 3671*

ACUPUNCTURE
- GASTROINTESTINAL
  - DYSKINESIA, 3409
- VAGOTOMY
  - SEQUELAE, 3409

ACUTE
- ABDOMEN
  - CHILDREN, 3873
  - RADIOLOGY, 3873

ADHESIONS
- ESOPHAGUS
  - ULCER, 3337
- PERITONEUM
  - PREVENTION, 3874
  - SIMULATION, 3874

ADHESIVES
- SEE TISSUE ADHESIVES

ADOLESCENTS
- CHOLELITHIASIS, 3808*

AGE FACTORS
- SEE ALSO CHILDREN, NEONATE
- BILIARY TRACT
  - FISTULA, 3824
- CHOLELITHIASIS
  - COMPLICATIONS, 3824
- COLON
  - DIVERTICULUM, 3560
  - NEOPLASMS, MALIGNANT, 3557
- CROHNS DISEASE, 3490
- DIVERTICULITIS
  - LARGE INTESTINE, 3587
- GAS, INTESTINAL, 3859
- LIVER FUNCTION TESTS
  - COENZYMES, 3151
- PANCREAS
  - NEOPLASMS, MALIGNANT, 3633
- PEPTIC ULCER
  - BLEEDING, 3411
- SMALL INTESTINE
  - ENDOCRINE SYSTEM, 2987
- STOMACH
  - PROTEIN, 3096

ALCOHOL
- AMINO ACIDS
  - METABOLISM, 3146
- BLOOD
  - ALCOHOLISM, 3779*
  - CIRRHOSIS, 3779*
- FATTY ACIDS
  - METABOLISM, 3141, 3175
- FATTY LIVER
  - DIETARY FACTORS, 3133*
  - ETIOLOGY, 3132*
- LIPIDS
  - METABOLISM, 3198*
- LIPOPROTEINS
  - METABOLISM, 3198*
- LIVER
  - COENZYMES, 3175
  - ENZYMES, 3134*, 3146
  - FIBROSIS, 3186
  - METABOLISM, 3165
- LYSOSOMES
  - ENZYMES, 3176
- METABOLISM
  - ALCOHOLISM, 3786
  - DRUG EFFECTS ON, 3147
  - LIVER, 3150, 3177
- PANCREAS

    - ENZYMES, 3127
    - SECRETION, 3185
  - SMALL INTESTINE
    - METABOLISM, 3198*
  - TOLERANCE
    - DRUG EFFECTS ON, 3155
    - NERVOUS SYSTEM, 3155
  - TOXICITY
    - AMINO ACIDS, 3180

- ALCOHOLIC LIVER DISEASE
  - SEE LIVER DISEASE, ALCOHOLIC

- ALCOHOLISM
  - ALCOHOL
    - METABOLISM, 3786
  - BLOOD
    - ALCOHOL, 3779*
  - BONE
    - MINERALS, 3781
  - FATTY LIVER
    - CHEMICAL COMPOSITION, 3787
  - HEPATITIS, NONVIRAL
    - DIETARY FACTORS, 3790
  - LIVER DISEASE
    - CHEMICAL COMPOSITION, 3787
  - LIVER INJURY
    - REVIEWS, 3789

- ALCOHOLS, POLYHYDRIC
  - ABSORPTION
    - APPENDIX, 3007*
  - SECRETION
    - APPENDIX, 3007*

- ALDEHYDES
  - METABOLISM
    - LIVER, 3160
    - MITOCHONDRIA, 3160

- ALKALINE PHOSPHATASE
  - SEE PHOSPHATASE, ALKALINE

- ALKLOIDS
  - LIVER
    - TOXICITY, 3156

- ALLERGY
  - GASTROENTERITIS
    - DISEASES ASSOCIATED WITH, 3520

- AMEBIASIS
  - CHRONIC
    - DRUG TREATMENT, 3911
  - COLITIS
    - CHRONIC, 3907
    - DRUG TREATMENT, 3914
    - IMMUNOLOGY, 3907
  - COLON
    - NECROSIS, 3903
  - DIAGNOSIS
    - IMMUNOLOGY, 3275
  - DYSENTERY, 3909
  - INTESTINE
    - DRUG TREATMENT, 3913
    - REVIEWS, 3906
  - LIVER
    - ABSCESS, 3915
    - ECHOGRAPHY, 3244*
    - SCANNING, SCINTILLATION, 3244*

- AMINO ACIDS
  - ABSORPTION
    - SMALL INTESTINE, 3011*
  - ALCOHOL
    - TOXICITY, 3180
  - LIVER
    - LIPIDS, 2972
  - METABOLISM
    - ACIDOSIS, 3671*
    - ALCOHOL, 3146
    - LIVER, 3134*, 3671*
    - STOMACH, 3101
  - RECTUM
    - NEOPLASMS, MALIGNANT, 3590
  - SECRETION
    - INTESTINE, 3031
  - SODIUM
    - ABSORPTION, 3005*
  - WATER
    - ABSORPTION, 3005*

- AMYLASE
  - BLOOD
    - PANCREAS DISEASE, 3620*
    - PANCREAS FUNCTION TESTS, 3253
  - PANCREAS
    - DIARRHEA, 3626
    - TRAUMA, 3638
  - URINE
    - PANCREAS DISEASE, 3620*

- AMYLOIDOSIS
  - COLON, 3545
  - CROHNS DISEASE
    - DISEASES ASSOCIATED WITH, 3491
  - DIAGNOSIS, 3881
  - ESOPHAGUS
    - MOTILITY, 3850
  - LIVER
    - JAUNDICE, 3683
  - THERAPY, 3881

- ANALGESICS
  - ABSORPTION
    - MOTILITY, 3030
  - GASTROINTESTINAL
    - BLEEDING, 3860

- ANALYSIS
  - BILE
    - BILE ACIDS, 3142
  - BILE ACIDS
    - TECHNIQUES, 3194*
  - BILE SALTS
    - ENZYMES, 3126
  - SMALL INTESTINE
    - SECRETION, 3194*

- ANASTOMOSIS
  - INTESTINE
    - CHEMOTHERAPY, 3472
    - THERAPY, 3474

- ANEMIA
  - CROHNS DISEASE
    - DISEASES ASSOCIATED WITH, 3499
  - GASTROINTESTINAL

- DISEASES, 3901
- VITAMIN B12
  - DEFICIENCY, 3519

ANEMIA, PERNICIOUS
- BLOOD
  - GASTRIN, 2990
- DISEASES ASSOCIATED WITH
  - MALABOSRPTION, 3366
  - NEOPLASMS, MALIGNANT, 3374
  - POLYPS, 3374
- DUODENUM
  - TUBERCULOSIS, 3470
- STOMACH
  - ENDOCRINE SYSTEM, 3358*
  - ENDOSCOPY, 3374
  - ULTRASTRUCTURE, 3358*

ANEMIA, SICKLE CELL
- CHOLELITHIASIS
  - DISEASES ASSOCIATED WITH, 3812

ANESTHESIA
- COMPLICATIONS
  - VOMITING, 3045

ANEURYSM
- HEPATITIS, CHRONIC
  - SEQUELAE, 3763
- ILEUS
  - SIMULATION, 3439
- JAUNDICE, OBSTRUCTIVE
  - ETIOLOGY, 3811

ANGIOGRAPHY
- ABDOMEN, ACUTE
  - DIAGNOSIS, 3235*
- BILIARY TRACT
  - COMPLICATIONS, 3318
  - DISEASE, 3243*
  - TECHNIQUES, 3266
- ESOPHAGUS
  - NEOPLASMS, MALIGNANT, 3264
- JAUNDICE, OBSTRUCTIVE
  - TECHNIQUES, 3234*
- LIVER
  - CIRRHOSIS, 3260
- NEOPLASMS, MALIGNANT
  - PANCREAS, 3236*
- PANCREAS
  - DISEASE, 3243*
- PANCREATITIS
  - TECHNIQUES, 3236*

ANOMALY
- CIRCULATION
  - LIVER, 3797
- ESOPHAGUS, 3342, 3347
- GASTROINTESTINAL TRACT
  - CHILDREN, 3877, 3892
- INTESTINE
  - DISEASES ASSOCIATED WITH, 3475
- SMALL INTESTINE
  - MESENTERY, 3894
- STOMACH, 3373

ANOMALY, CONGENITAL
- ESOPHAGUS, 3320
- ILEUM
  - PERFORATION, 3448
- INTESTINE
  - MORPHOLOGY, 3452
- LIVER
  - BILIARY TRACT, 3681
- PANCREAS, 3630
- PEPTIC ULCER
  - PERFORATION, 3448
- SMALL INTESTINE
  - ATRESIA, 3455
  - STENOSIS, 3455
- STOMACH
  - THERAPY, 3363

ANORECTUM
- LEUKEMIA
  - COMPLICATIONS, 3579
- SPHINCTER
  - CONSTIPATION, 3562
  - INCONTINENCE, 3562
- THERAPY, 3586, 3588

ANOXIA
- SMALL INTESTINE
  - MOTILITY, 3059

ANTIBACTERIALS
- HEPATITIS, NONVIRAL
  - ETIOLOGY, 3724
- LIVER INJURY, 3718
- ULCERATIVE COLITIS
  - PREVENTION, 3614
- VITAMIN B12
  - MALABSORPTION, 3503*

ANTIBIOTICS
- SEE ALSO ANTIBACTERIALS, DRUG TREATMENT
- CHOLECYSTITIS
  - DRUG TREATMENT, 3830
- COLITIS
  - ETIOLOGY, 3543*
- LIVER
  - RIBOSOMES, 2974
- LIVER FUNCTION TESTS, 3716
- PERITONITIS
  - DRUG TREATMENT, 3890

ANTICOAGULANTS
- ABSORPTION
  - JEJUNUM, 3032
- STOMACH
  - ACID SECRETION, 3083

ANTICONVULSANTS
- CHOLESTASIS
  - ETIOLOGY, 3709*

ANTIDEPRESSANTS
- LIVER FUNCTION TESTS, 3722

ANTIEMETICS
- STOMACH
  - MOTILITY, 3045

ANTIGEN, AUSTRALIA
- CIRRHOSIS
  - FAMILIAL FACTORS, 3728*
- DOWNS SYNDROME, 3740

- HEPATITIS
  - NEONATE, 3732, 3733
- HEPATITIS, CHRONIC
  - FAMILIAL FACTORS, 3728*
- HEPATITIS, SERUM
  - PROGNOSIS, 3731
- HEPATITIS, VIRAL, 3741
  - EPIDEMIOLOGY, 3738
  - TRANSMISSION, 3728*, 3729*
- IMMUNOLOGY, 3245*
- LIVER DISEASE
  - TECHNIQUES, 3299
- TECHNIQUES, 3269, 3280, 3281, 3315

ANTIGEN, CARCINOEMBRYONIC
- BLOOD
  - CIRRHOSIS, 3805
- LIVER
  - CIRRHOSIS, 3805
- LIVER DISEASE, ALCOHOLIC, 3784

ANTIHYPERTENSIVE AGENTS
- HEPATITIS, NONVIRAL, 3712

ANTIINFLAMMATORY AGENTS
- GASTROINTESTINAL
  - BLEEDING, 3224
- JEJUNUM
  - ULCER, 3481
- LIVER INJURY
  - ETIOLOGY, 3707*

ANTIMETABOLITES
- CHOLESTASIS
  - NAPHTHYLISOTHIOCYANATE, ALPHA, 3704
- HYPERBILIRUBINEMIA
  - NAPHTHYLISOTHIOCYANATE, ALPHA, 3704
- PANCREATITIS
  - DRUG TREATMENT, 3646*

ANTRECTOMY
- SEE ALSO GASTRECTOMY
- SEE ALSO STOMACH, SURGERY
- STOMACH
  - ACID SECRETION, 3073*

ANTRUM
- SEE ALSO STOMACH

ANUS
- SEE ALSO LARGE INTESTINE
- ABSCESS, 3558

APPENDICITIS
- CHILDREN, 3571
- COMPLICATIONS
  - MUSCULOSKELETAL SYSTEM, 3597
- EPIDEMIOLOGY
  - SURVIVAL, 3604
- ETHNIC FACTORS, 3593
- ETIOLOGY
  - DIETARY FACTORS, 3593

APPENDIX
- SEE ALSO LARGE INTESTINE
- ALCOHOLS, POLYHYDRIC
  - ABSORPTION, 3007*
  - SECRETION, 3007*
- DIVERTICULUM, 3569
- ELECTROLYTE
  - ABSORPTION, 3007*
  - SECRETION, 3007*

AROMATIC HYDROCARBONS
- LIVER
  - NECROSIS, 3168
- LIVER INJURY, 3725
- SMALL INTESTINE
  - MORPHOLOGY, 2985

ASCITES
- DIAGNOSIS
  - ECHOGRAPHY, 3238*
- PANCREAS
  - NEOPLASMS, MALIGNANT, 3635
- PANCREATITIS, CHRONIC, 3663

ASPIRIN
- LIVER INJURY
  - CHILDREN, 3726
- STOMACH
  - ABSORPTION, 3076*
  - ACID SECRETION, 3076*, 3108, 3362
  - BLEEDING, 3362
  - CIRCULATION, 3216*
  - ELECTROPHYSIOLOGY, 3076*
  - ULCER, 3362

ATHEROSCLEROSIS
- PEPTIC ULCER
  - DISEASES ASSOCIATED WITH, 3399

ATRESIA
- BILIARY TRACT
  - CIRRHOSIS, BILIARY, 3820
  - ETIOLOGY, 3825
  - NEOPLASMS, MALIGNANT, 3820
  - SURGERY, 3826
- INTESTINE
  - SIMULATION, 3451
- SMALL INTESTINE
  - ANOMALY, CONGENITAL, 3455

AUTOIMMUNITY
- LIVER DISEASE
  - REVIEWS, 3765

AUTORADIOGRAPHY
- DUODENUM
  - MORPHOLOGY, 2967
- JEJUNUM
  - MORPHOLOGY, 2967

BACTERIA
- BILE ACIDS
  - METABOLISM, 3818
- DIARRHEA
  - ETIOLOGY, 3856
- DYSENTERY, 3909
  - EPIDEMIOLOGY, 3863, 3864, 3865

- GASTROENTERITIS
  - TRANSMISSION, 3886
- GLUCOSE
  - METABOLISM, 3003*
- INTESTINE
  - METABOLISM, 3231
- NITROSAMINES
  - METABOLISM, 3228
  - SMALL INTESTINE, 3228
- PERITONITIS
  - REVIEWS, 3869
- SMALL INTESTINE
  - BILE ACIDS, 3818
  - SURGERY, 3213
- VITAMIN B12
  - BLIND LOOP SYNDROME, 3510*

BEHAVIOR
- CELIAC DISEASE
  - DIET, 3523

BERYLLIUM
- LIVER
  - ULTRASTRUCTURE, 3161

BEZOARS
- SEE FOREIGN BODIES

BICARBONATE SECRETION
- DUODENUM
  - ULCER, 3393

BILE
- ANALYSIS
  - BILE ACIDS, 3142
- CHEMICAL COMPOSITION
  - CHOLELITHIASIS, 3179
- CHOLESTEROL
  - ABSORPTION, 3009*
- ESOPHAGITIS, 3333
- SECRETION
  - CHOLESTASIS, 3809
  - HISTAMINE, 3162
  - PANCREOZYMIN, 3809
  - PENTAGASTRIN, 3162
  - POLYCYCLIC HYDROCARBONS, 3143, 3144
  - SECRETIN, 3809
  - VASOPRESSIN, 3137

BILE ACIDS
- ANALYSIS
  - ENZYMES, 3126
  - TECHNIQUES, 3194*
- BILE
  - ANALYSIS, 3142
- BLOOD
  - TECHNIQUES, 3256
- CHEMICAL COMPOSITION
  - BILIARY DISEASE, 3694
  - ELECTROPHORESIS, 3434*
  - LIVER DISEASE, 3694
- CHOLESTEROL
  - SYNTHESIS, 3170
- ESOPHAGITIS
  - ETIOLOGY, 3332
- FATTY ACIDS
  - ABSORPTION, 3199*
- LIVER
  - ION TRANSPORT, 3163
  - TISSUE CULTURE, 3164
- METABOLISM
  - BACTERIA, 3818
- SMALL INTESTINE
  - BACTERIA, 3818
  - MICROORGANISMS, 3483*
  - SURGERY, 3483*
- STOMACH
  - CIRCULATION, 3216*
  - ION TRANSPORT, 3382*
- SYNTHESIS, 3140
  - CHOLESTEROL, 3181
  - KINETICS, 3182

BILE DUCT
- CYSTS
  - CHILDREN, 3819
- DILATATION
  - CHILDREN, 3819
- FASCIOLIASIS, 3923
- TRAUMA
  - SURGERY, 3815

BILE SALTS
- SEE BILE ACIDS

BILIARY DISEASE
- BILE ACIDS
  - CHEMICAL COMPOSITION, 3694
- BLOOD
  - PROTEIN, 3778
- DIAGNOSIS
  - ENZYMES, 3303
- DISEASES ASSOCIATED WITH
  - SPLENOMEGALY, 3821
- SULFOBROMOPHTHALEIN
  - KINETICS, 3263

BILIARY TRACT
- ANGIOGRAPHY
  - COMPLICATIONS, 3318
  - TECHNIQUES, 3266
- ATRESIA
  - CIRRHOSIS, BILIARY, 3820
  - ETIOLOGY, 3825
  - NEOPLASMS, MALIGNANT, 3820
  - SURGERY, 3826
- CONTRAST MEDIA
  - ABSORPTION, 3033
- DISEASE
  - ANGIOGRAPHY, 3243*
- FISTULA
  - AGE FACTORS, 3824
  - ILEUS, 3823
- LIVER
  - ANOMALY, CONGENITAL, 3681
  - DILATATION, 3829
- MORPHOLOGY
  - PHENOBARBITAL, 3171
- NEOPLASMS, MALIGNANT
  - OBSTRUCTION, 3831
  - SURGERY, 3831
- OBSTRUCTION
  - IMMUNOLOGY, 3246*
  - NUCLEOTIDASE, 3178
  - PHOSPHATASE, ALKALINE, 3178
  - RADIOISOTOPES, 3246*

  - RADIOLOGY
    - CHOLEDOCHOLITHIASIS, 3814
  - STRICTURE
    - SURGERY, 3822
  - SURGERY
    - COMPLICATIONS, 3817
    - TECHNIQUES, 3832

- BILIRUBIN
  - ABSORPTION
    - JEJUNUM, 3013

- BINDING
  - SEE METABOLISM

- BIOPSY
  - COLON
    - INFLAMMATION, 3618
  - GASTRITIS
    - MORPHOLOGY, 3378
  - LIVER
    - ENZYMES, 3259, 3307
    - PSORIASIS, 3675
    - SALMONELLOSIS, 3714
    - SARCOIDOSIS, 3713
    - TUBERCULOSIS, 3713
  - RECTUM
    - COLITIS, 3311
    - CROHNS DISEASE, 3487*
  - SMALL INTESTINE
    - CELIAC DISEASE, 3278
    - PELLAGRA, 3514
    - WHIPPLES DISEASE, 3524

- BLEEDING
  - DIAGNOSIS, 3841
  - DUODENUM
    - ULCER, 3407, 3411
  - ESOPHAGUS
    - DIVERTICULUM, 3334
    - VARICES, 3343
  - ETIOLOGY
    - NEOPLASMS, MALIGNANT, 3839
    - PEPTIC ULCER, 3839
    - PLATELETS, 3847
    - STRESS, 3854
  - GASTROINTESTINAL
    - ANALGESICS, 3860
    - ANTIINFLAMMATORY AGENTS, 3224
    - DIAGNOSIS, 3268, 3879
    - DISEASES ASSOCIATED WITH, 3453
    - ENDOSCOPY, 3297
    - ETIOLOGY, 3898
    - INTUBATION, 3268
    - TECHNIQUES, 3224
  - GASTROINTESTINAL TRACT
    - NERVOUS SYSTEM, 3888
    - THERAPY, 3871
  - ILEUM
    - HEMANGIOMA, 3445
  - JEJUNUM
    - TELANGIECTASIA, 3453
  - LARGE INTESTINE
    - NEOPLASMS, MALIGNANT, 3282
  - PANCREATIC DUCT
    - PANCREATITIS, 3658
  - PEPTIC ULCER
    - AGE FACTORS, 3411
    - TEMPERATURE, 3407
    - TRAUMA, 3380*
  - STOMACH
    - ASPIRIN, 3362
  - THERAPY, 3841

- BLIND LOOP SYNDROME
  - VITAMIN B12
    - ABSORPTION, 3510*
    - BACTERIA, 3510*

- BLOOD
  - ALCOHOL
    - ALCOHOLISM, 3779*
    - CIRRHOSIS, 3779*
  - AMYLASE
    - PANCREAS DISEASE, 3620*
    - PANCREAS FUNCTION TESTS, 3253
  - ANTIGEN, CARCINOEMBRYONIC
    - CIRRHOSIS, 3805
  - BILE ACIDS
    - TECHNIQUES, 3256
  - CALCIUM
    - ENTERECTOMY, 3207
    - GLUCAGON, 3106
    - PARATHYROID GLANDS, 3207
  - GASTRIN
    - ANEMIA, PERNICIOUS, 2990
    - IMMUNOLOGY, 2990
  - GLYCOPROTEINS
    - HEPATITIS, CHRONIC, 3777
  - IMMUNOGLOBULINS
    - CIRRHOSIS, 3774, 3802
    - HEPATITIS, CHRONIC, 3774
  - PROTEIN
    - BILIARY DISEASE, 3778
    - LIVER DISEASE, 3778
    - PANCREATITIS, 3649*

- BLOOD FLOW
  - SEE CIRCULATION

- BONE
  - MINERALS
    - ALCOHOLISM, 3781
    - GASTRECTOMY, 3781

- CAFFEINE
  - LARGE INTESTINE
    - ELECTROPHYSIOLOGY, 3060
    - MOTILITY, 3060

- CALCIFICATION
  - PANCREATITIS, CHRONIC, 3668
    - FAMILIAL FACTORS, 3662

- CALCIUM
  - BLOOD
    - ENTERECTOMY, 3207
    - GLUCAGON, 3106
    - PARATHYROID GLANDS, 3207
  - CECUM
    - ION TRANSPORT, 3053
    - MOTILITY, 3053
  - DUODENUM
    - PROTEIN, 3208
  - INTESTINE
    - MOTILITY, 3047
  - ION TRANSPORT
    - SUGAR, 3020

- JEJUNUM
  - ION TRANSPORT, 3023
- METABOLISM
  - EMBRYOLOGY, 3200*
  - GASTRECTOMY, 3391
  - HORMONE, 3222
  - PENTAGASTRIN, 3222
  - SMALL INTESTINE, 3200*
  - VITAMIN D, 3200*

CANCER
- SEE NEOPLASMS, MALIGNANT

CARBON TETRACHLORIDE
- LIVER
  - RIBOSOMES, 2974
- LIVER INJURY
  - SPLENECTOMY, 3769

CARBONIC ANHYDRASE INHIBITORS
- PANCREAS
  - SECRETION, 3119*

CARCINOIDS
- ILEUM
  - METASTASIS, 3477
- INTESTINE
  - DIAGNOSIS, 3284
- SEROTONIN
  - METABOLISM, 3284

CATECHOLAMINES
- INTESTINE
  - ABSORPTION, 2998
  - ENZYMES, 2998
  - ULTRASTRUCTURE, 2998

CATHARTICS
- SEE LAXATIVES

CECUM
- SEE ALSO LARGE INTESTINE
- DIVERTICULUM, 3591
- ELECTROPHYSIOLOGY
  - TEMPERATURE, 3050
- ION TRANSPORT
  - CALCIUM, 3053
- MOTILITY
  - CALCIUM, 3053
  - DRUG EFFECTS ON, 3053
  - TEMPERATURE, 3050
- NECROSIS
  - CHEMOTHERAPY, 3563
- PERFORATION
  - CHEMOTHERAPY, 3563
  - ILEUS, 3544

CELIAC DISEASE
- CHOLECYSTOKININ
  - SECRETION, 3504*
- DIET
  - BEHAVIOR, 3523
- EPIDEMIOLOGY
  - ETHNIC FACTORS, 3507*
- IMMUNOLOGY, 3506*
- JEJUNUM
  - ULTRASTRUCTURE, 3506*
- LIPIDS
  - MALABSORPTION, 3504*
- PEPTIDASE
  - DEFICIENCY, 3500*
- SMALL INTESTINE
  - BIOPSY, 3278
  - NEOPLASMS, MALIGNANT, 3533

CHEMICAL BURNS
- ESOPHAGUS
  - CHILDREN, 3351
  - REVIEWS, 3351
  - THERAPY, 3331, 3353
- INJURY
  - ACID, 3889

CHEMICAL COMPOSITION
- BILE
  - CHOLELITHIASIS, 3179
- BILE ACIDS
  - BILIARY DISEASE, 3694
  - ELECTROPHORESIS, 3434*
  - LIVER DISEASE, 3694
- FATTY LIVER
  - ALCOHOLISM, 3787
- GLYCOPROTEINS, 2992
- HORMONE
  - SMALL INTESTINE, 3205
- INTESTINE
  - STEROL, 3204
- LIVER
  - HEPATITIS, NONVIRAL, 3792
  - SEDATIVES, 3149
  - ULTRASTRUCTURE, 3184
- LIVER DISEASE
  - ALCOHOLISM, 3787
- PITUITARY GLAND
  - HORMONE, 3061
- SMALL INTESTINE
  - CROHNS DISEASE, 3489
- STOMACH
  - MUCUS, 3389*

CHEMORECEPTION
- KINETICS
  - ACIDITY, 3229

CHEMOTHERAPY
- CECUM
  - NECROSIS, 3563
  - PERFORATION, 3563
- INTESTINE
  - ANASTOMOSIS, 3472
- LIVER
  - METASTASIS, 3596
- STOMACH
  - NEOPLASMS, MALIGNANT, 3359

CHILDREN
- SEE ALSO NEONATE, AGE FACTORS
- ACUTE
  - ABDOMEN, 3873
- APPENDICITIS, 3571
- BILE DUCT
  - CYSTS, 3819
  - DILATATION, 3819
- CIRRHOSIS
  - MORPHOLOGY, 3806
- DIARRHEA, 3861
- DUODENUM
  - TRAUMA, 3627

    - ULCER, 3413
  - ENTEROCOLITIS, 3896
    - SURVIVAL, 3880
    - THERAPY, 3857
  - ESOPHAGUS
    - CHEMICAL BURNS, 3351
  - GASTROENTERITIS
    - DEHYDRATION, 3853
  - GASTROINTESTINAL
    - ELECTROPHYSIOLOGY, 3308
  - GASTROINTESTINAL TRACT
    - ANOMALY, 3877, 3892
    - PERFORATION, 3870
  - HERNIA, HIATUS
    - SURGERY, 3339
  - LIVER INJURY
    - ASPIRIN, 3726
  - MALABSORPTION, 3527
  - PAIN
    - DIAGNOSIS, 3858
    - DRUG TREATMENT, 3885
  - PANCREAS
    - TRAUMA, 3627
  - PARASITES AND PARASITIC DISEASE
    - EPIDEMIOLOGY, 3905
  - PARASITES AND PARASITIC DISEASES
    - EPIDEMIOLOGY, 3918
  - PEPTIC ULCER, 3406
  - PERITONITIS, 3883
    - DIAGNOSIS, 3884
  - PORTAL HYPERTENSION, 3679
  - SMALL INTESTINE
    - MORPHOLOGY, 2989, 3463

- CHLORIDE
  - ILEUM
    - ION TRANSPORT, 3012*

- CHOLANGIOGRAPHY
  - SEE ANGIOGRAPHY

- CHOLANGITIS, OBSTRUCTIVE
  - NAPHTHYLISOTHIOCYANATE, ALPHA, 3172

- CHOLECYSTITIS
  - DRUG TREATMENT
    - ANTIBIOTICS, 3830
  - EPIDEMIOLOGY
    - ETHNIC FACTORS, 3828

- CHOLECYSTOKININ
  - IRRITABLE COLON
    - MOTILITY, 3592
  - JEJUNUM
    - ION TRANSPORT, 3004*
  - PANCREAS
    - SECRETION, 3128
  - SECRETION
    - CELIAC DISEASE, 3504*
  - SMALL INTESTINE
    - ENZYMES, 3190*
  - STOMACH
    - ACID SECRETION, 3074*
  - WATER
    - ABSORPTION, 3004*

- CHOLEDOCHOLITHIASIS
  - BILIARY TRACT
    - RADIOLOGY, 3814
    - SURGERY, 3816
    - THERAPY, 3813, 3834

- CHOLELITHIASIS
  - ADOLESCENTS, 3808*
  - BILE
    - CHEMICAL COMPOSITION, 3179
  - COMPLICATIONS
    - AGE FACTORS, 3824
    - SURGERY, 3833
  - DISEASES ASSOCIATED WITH
    - ANEMIA, SICKLE CELL, 3812
  - EPIDEMIOLOGY
    - ETHNIC FACTORS, 3828
  - VAGOTOMY
    - SEQUELAE, 3252

- CHOLERA
  - JEJUNUM
    - ELECTROPHYSIOLOGY, 3196*
    - ION TRANSPORT, 3196*
    - SECRETION, 3211
  - MUCOSA
    - MORPHOLOGY, 3891
  - PREVENTION
    - IMMUNOLOGY, 3897
  - STOMACH
    - ACIDITY, 3855

- CHOLESTASIS
  - BILE
    - SECRETION, 3809
  - ETIOLOGY
    - ANTICONVULSANTS, 3709*
  - LIVER
    - ULTRASTRUCTURE, 3184
  - NAPHTHYLISOTHIOCYANATE, ALPHA
    - ANTIMETABOLITES, 3704
  - REVIEWS, 3827

- CHOLESTEROL
  - ABSORPTION
    - BILE, 3009*
    - EMULSIFYING AGENTS, 3009*
    - SMALL INTESTINE, 3009*
  - BILE ACIDS
    - SYNTHESIS, 3181
  - SYNTHESIS
    - BILE ACIDS, 3170
    - DIETARY FACTORS, 3135*
    - JAUNDICE, OBSTRUCTIVE, 3135*
    - LIVER, 3135*, 3170, 3174
    - REVIEWS, 3174

- CHOLINE
  - METABOLISM
    - LIVER, 3177

- CHOLINERGIC AGENTS
  - STOMACH
    - ACID SECRETION, 3093

- CHOLINESTERASE
  - ESTROGENS, 3100
  - SEX FACTORS, 3100
  - SMALL INTESTINE
    - MORPHOLOGY, 3201
  - STOMACH
    - MUCOSA, 3100

CHRONIC
  AMEBIASIS
    DRUG TREATMENT, 3911
  COLITIS
    AMEBIASIS, 3907

CIRCULATION
  ANOMALY
    LIVER, 3797
  COLON
    NEUROHUMORAL FACTORS, 3058
  ESOPHAGUS, 3230
  GASTRECTOMY
    DISEASES ASSOCIATED WITH, 3408
  HEPATITIS, NONVIRAL
    GALACTOSAMINE, 3173
  LIVER
    CIRRHOSIS, 3225
    MORPHOLOGY, 3000
    NECROSIS, 2984
    RADIOISOTOPES, 3799
    SCANNING, SCINTILLATION, 3302
    TRANSPLANTATION, 3226
  MESENTERY
    METASTASIS, 3477
  PANCREAS
    ABSORPTION, 3116*
    PROSTAGLANDIN, 3218*
  PORTAL HYPERTENSION
    CIRRHOSIS, 3785
    HEPATITIS, NONVIRAL, 3785
    LIVER DISEASE, ALCOHOLIC, 3785
    SURGERY, 3276
  SMALL INTESTINE
    ELECTROPHYSIOLOGY, 3214*
    NERVOUS SYSTEM, 3189*
    PEPTIDES, 3206
    PERFUSION, 3189*
  STOMACH
    ACID SECRETION, 3089
    ASPIRIN, 3216*
    BILE ACIDS, 3216*
    GASTRONE, 3082
    MORPHOLOGY, 2964*
    PEPTIC ULCER, 3381*
    RADIOISOTOPES, 3242*
    TECHNIQUES, 3217*

CIRRHOSIS
  ANTIGEN, AUSTRALIA
    FAMILIAL FACTORS, 3728*
  BLOOD
    ALCOHOL, 3779*
    ANTIGEN, CARCINOEMBRYONIC, 3805
    IMMUNOGLOBULINS, 3774, 3802
  DIAGNOSIS
    GALACTOSE TOLERANCE, 3262
  DISEASES ASSOCIATED WITH
    GASTRITIS, ATROPHIC, 3779*
    PEPTIC ULCER, 3391
    PITUITARY GLAND, 3800
  DRUG TREATMENT
    SUGAR, 3793*
  ESOPHAGUS
    VARICES, 3794
  HYPERTENSION
    SURGERY, 3798
  LIVER
    ANGIOGRAPHY, 3260
    ANTIGEN, CARCINOEMBRYONIC, 3805
    CIRCULATION, 3225
  MORPHOLOGY
    CHILDREN, 3806
  PORTAL HYPERTENSION
    CIRCULATION, 3785
  PROGNOSIS, 3803
  STEATORRHEA
    ETIOLOGY, 3807
  STOMACH
    ACID SECRETION, 3115
  VASCULAR
    SURGERY, 3225

CIRRHOSIS, BILIARY, 3801
  BILIARY TRACT
    ATRESIA, 3820
  DISEASES ASSOCIATED WITH
    NERVOUS SYSTEM, 3804
  HEPATITIS, CHRONIC
    DISEASES ASSOCIATED WITH, 3768

CLOTTING
  HEPATITIS, VIRAL
    RADIOISOTOPES, 3730*

COENZYMES
  LIVER
    ALCOHOL, 3175
  LIVER FUNCTION TESTS
    AGE FACTORS, 3151

COLITIS
  SEE ALSO ULCERATIVE COLITIS
  AMEBIASIS
    CHRONIC, 3907
    DRUG TREATMENT, 3914
    IMMUNOLOGY, 3907
  CYSTS, 3567
  DISEASES ASSOCIATED WITH
    ISCHEMIA, 3583
  ETIOLOGY
    ANTIBIOTICS, 3543*
  RECTUM
    BIOPSY, 3311
    CYSTS, 3585
  SIMULATION, 3494
  THERAPY, 3613

COLON
  SEE ALSO LARGE INTESTINE
  AMYLOIDOSIS, 3545
  CIRCULATION
    NEUROHUMORAL FACTORS, 3058
  CROHNS DISEASE
    ETIOLOGY, 3610
    SURGERY, 3611
  DIVERTICULUM
    AGE FACTORS, 3560
    SURGERY, 3601
  FISTULA
    DIVERTICULUM, 3566
    NEOPLASMS, MALIGNANT, 3566
  INFLAMMATION
    BIOPSY, 3618
    EPIDEMIOLOGY, 3616
  KINETICS, CELL, 2977
  LYMPHATICS
    HYPERPLASIA, 3542*, 3581

    - NEOPLASMS, 3542*
  - MOTILITY
    - HORMONE EFFECTS ON, 3054
    - NERVOUS CONTROL, 3054
    - NEUROHUMORAL FACTORS, 3058
  - NECROSIS
    - AMEBIASIS, 3903
  - NEOPLASMS, 3575
  - NEOPLASMS, BENIGN, 3554
  - NEOPLASMS, MALIGNANT, 3554, 3556
    - AGE FACTORS, 3557
    - IMMUNOLOGY, 3540*
    - METASTASES, 3542*
    - PERFORATION, 3572
    - RADIOTHERAPY, 3578
    - REVIEWS, 3602
    - RISK FACTORS, 3555
    - SURGERY, 3548, 3572, 3577
    - SURVIVAL, 3559, 3561, 3580
    - ULCERATIVE COLITIS, 3576
  - POLYPS
    - NEOPLASMS, MALIGNANT, 3594
    - SURGERY, 3573, 3574, 3595
  - SECRETION
    - FATTY ACIDS, 3197*
  - VOLVULUS
    - HAMARTOMA, 3546

COMPRESSION
  - SMALL INTESTINE
    - OBSTRUCTION, 3444

COMPUTERS
  - JAUNDICE
    - DIAGNOSIS, 3703

CONNECTIVE TISSUE
  - HERNIA, HIATUS
    - ETIOLOGY, 3355

CONSTIPATION
  - ANORECTUM
    - SPHINCTER, 3562

CONSTITUTIONAL FACTORS
  - KWASHIORKOR, 3537

CONTRAST MEDIA
  - ABSORPTION
    - BILIARY TRACT, 3033
  - DUODENUM
    - DIAGNOSIS, 3295
  - INTESTINE
    - DYSKINESIA, 3024
  - LARGE INTESTINE
    - PERFORATION, 3598
  - LIVER
    - ION TRANSPORT, 3163
  - STOMACH
    - DIAGNOSIS, 3295
  - ULCERATIVE COLITIS
    - RADIOLOGY, 3233*

COPPER
  - ABSORPTION
    - SMALL INTESTINE, 3037

CORTICOSTEROIDS
  - DUODENUM
    - MITOSIS, 2994
  - GASTRITIS, ATROPHIC
    - DRUG TREATMENT, 3356*
  - HEPATITIS, VIRAL
    - DRUG TREATMENT, 3187
  - LIVER
    - EMBRYOLOGY, 2966
    - MORPHOLOGY, 2966
    - TISSUE CULTURE, 2966
  - STOMACH
    - SECRETION, 3085, 3094
  - VITAMIN B12
    - ABSORPTION, 3356*

CROHNS DISEASE
  - AGE FACTORS, 3490
  - COLON
    - ETIOLOGY, 3610
    - SURGERY, 3611
  - COMPLICATIONS
    - UROGENITAL SYSTEM, 3492
  - DISEASES ASSOCIATED WITH
    - AMYLOIDOSIS, 3491
    - ANEMIA, 3499
  - ESOPHAGUS, 3336
  - IMMUNOLOGY, 3484*, 3485*, 3488*
  - MESENTERY
    - LYMPHATICS, 3493
  - MOUTH, 3498
  - RECTUM
    - BIOPSY, 3487*
  - SMALL INTESTINE
    - CHEMICAL COMPOSITION, 3489
  - SURGERY, 3612
  - ULTRASTRUCTURE
    - TECHNIQUES, 3496

CYCLIC ADENOSINE MONOPHOSPHATE
  - INTESTINE
    - MOTILITY, 3047

CYSTIC FIBROSIS
  - DISEASES ASSOCIATED WITH, 3628
  - REVIEWS, 3632
  - SODIUM
    - SALIVA, 3637

CYSTS
  - BILE DUCT
    - CHILDREN, 3819
  - COLITIS, 3567
    - LIVER
      - SCANNING, SCINTILLATION, 3239*
  - RECTUM
    - COLITIS, 3585

CYTOLOGY, EXFOLIATIVE
  - STOMACH
    - NEOPLASMS, MALIGNANT, 3241*
    - ULCER, 3241*

DEATH
  - SEE SURVIVAL

DEFECATION
  - RECTUM
    - STIMULATION, 3043*

- DEFICIENCY
  - IMMUNOGLOBULINS
    - ULCERATIVE ENTERITIS, 3502*
  - ISOMALTASE
    - CARBOHYDRATE, 3508*
  - PANCREAS
    - ENZYMES, 3522
  - PEPTIDASE
    - CELIAC DISEASE, 3500*
  - PROTEIN
    - FATTY LIVER, 3782
  - SUCRASE
    - CARBOHYDRATE, 3508*
  - VITAMIN B12
    - ANEMIA, 3519
    - MALABSORPTION, 3519

- DEHYDRATION
  - GASTROENTERITIS
    - CHILDREN, 3853

- 2-DEOXY-D-GLUCOSE
  - STOMACH
    - ACID SECRETION, 3071*, 3073*
    - PEPSIN, 3071*

- DETOXIFICATION
  - LIVER
    - MICROSOMES, 3169

- DIABETES
  - JEJUNUM
    - DISACCHARIDASE, 3518

- DIAGNOSIS
  - ABDOMEN, ACUTE
    - ANGIOGRAPHY, 3235*
  - AMEBIASIS
    - IMMUNOLOGY, 3275
  - AMYLOIDOSIS, 3881
  - ASCITES
    - ECHOGRAPHY, 3238*
  - BILIARY DISEASE
    - ENZYMES, 3303
  - BLEEDING, 3841
  - CIRRHOSIS
    - GALACTOSE TOLERANCE, 3262
  - DIARRHEA, 3902
  - DUODENUM
    - CONTRAST MEDIA, 3295
    - ULCER, 3288, 3402
  - ECHINOCOCCOSIS
    - LIVER, 3912
  - ESOPHAGUS
    - NEOPLASMS, MALIGNANT, 3348
  - GASTRITIS, HYPERTROPHIC, 3364
  - GASTROINTESTINAL
    - BLEEDING, 3268, 3879
    - RADIOIMMUNOASSAY, 3290
  - HEPATITIS, CHRONIC, 3775
  - HEPATITIS, VIRAL
    - LIVER FUNCTION TESTS, 3298
  - ILEUS, 3438, 3440
  - INTESTINE
    - CARCINOIDS, 3284
  - JAUNDICE
    - COMPUTERS, 3703
    - LIPOPROTEINS, 3285
    - RADIOISOTOPES, 3702
  - JAUNDICE, OBSTRUCTIVE
    - NEOPLASMS, MALIGNANT, 3631
    - TECHNIQUES, 3270
  - LACTASE DEFICIENCY
    - LACTOSE TOLERANCE, 3261
  - LARGE INTESTINE
    - NEOPLASMS, MALIGNANT, 3282
  - LIVER DISEASE, 3256
    - ENZYMES, 3286, 3303
    - ISOENZYMES, 3258
    - RADIOISOTOPES, 3300
    - SULFOBROMOPHTHALEIN, 3300
  - PAIN
    - CHILDREN, 3858
  - PANCREAS
    - NEOPLASMS, MALIGNANT, 3622
  - PERITONITIS
    - CHILDREN, 3884
  - STOMACH
    - CONTRAST MEDIA, 3295
    - RADIOTELEMETRY, 3306
  - VAGOTOMY
    - ELECTROPHYSIOLOGY, 3232*
  - WILSONS DISEASE, 3673*

- DIARRHEA
  - CHILDREN, 3861
  - DIAGNOSIS, 3902
  - DRUG TREATMENT
    - SEQUELAE, 3526
  - ENTERECTOMY
    - SEQUELAE, 3526
  - ETIOLOGY
    - BACTERIA, 3856
  - ILEUM
    - SURGERY, 3497
  - PANCREAS
    - AMYLASE, 3626
  - STOMACH
    - ACIDITY, 3855
  - THERAPY, 3878
  - VAGOTOMY
    - SEQUELAE, 3403

- DIET
  - CELIAC DISEASE
    - BEHAVIOR, 3523
  - ENTERECTOMY
    - THERAPY, 3513
  - PANCREATITIS
    - COMPLICATIONS, 3647*

- DIETARY FACTORS
  - APPENDICITIS
    - ETIOLOGY, 3593
  - CHOLESTEROL
    - SYNTHESIS, 3135*
  - FATTY LIVER
    - ALCOHOL, 3133*
  - FECES
    - LIPIDS, 3505*
  - GASTROINTESTINAL
    - DISEASES, 3868
  - HEPATITIS, NONVIRAL
    - ALCOHOLISM, 3790
  - LIVER
    - FIBROSIS, 3186

        GLYCOGEN, 2971
        LIPIDS, 2972
        RIBOSOMES, 2975
    PANCREAS
        ENZYMES, 3122*
    PEPSIN
        METABOLISM, 3099
    STOMACH
        SECRETION, 3098
    SUGAR
        ABSORPTION, 3191*, 3193*
        METABOLISM, 3191*, 3193*
    TRACE ELEMENT
        ABSORPTION, 3014

DILATATION
    BILE DUCT
        CHILDREN, 3819
    ESOPHAGUS
        STRICTURE, 3330, 3340
    LIVER
        BILIARY TRACT, 3829

DISACCHARIDASE
    SEE ALSO LACTASE
    JEJUNUM
        DIABETES, 3518
        FRUCTOSE, 3525
    SMALL INTESTINE
        GASTRECTOMY, 3539
        MALABSORPTION, 3261
        ULCERATIVE COLITIS, 3539

DISEASES
    GASTROINTESTINAL
        ANEMIA, 3901
        DIETARY FACTORS, 3868
        MUCOSA, 3486*
    SALIVARY GLANDS, 3838

DISEASES ASSOCIATED WITH
    ANEMIA, PERNICIOUS
        MALABOSRPTION, 3366
        NEOPLASMS, MALIGNANT, 3374
        POLYPS, 3374
    BILIARY DISEASE
        SPLENOMEGALY, 3821
    CHOLELITHIASIS
        ANEMIA, SICKLE CELL, 3812
    CIRRHOSIS
        GASTRITIS, ATROPHIC, 3779*
        PEPTIC ULCER, 3391
        PITUITARY GLAND, 3800
    CIRRHOSIS, BILIARY
        NERVOUS SYSTEM, 3804
    COLITIS
        ISCHEMIA, 3583
    CROHNS DISEASE
        AMYLOIDOSIS, 3491
        ANEMIA, 3499
    CYSTIC FIBROSIS, 3628
    DUODENITIS, 3447
    GARDNERS SYNDROME
        NEOPLASMS, BENIGN, 3547
    GASTRECTOMY
        CIRCULATION, 3408
    GASTROENTERITIS
        ALLERGY, 3520
        PROTEIN-LOSING ENTEROPATHY, 3520
    GASTROINTESTINAL
        BLEEDING, 3453
    HEMOCHROMATOSIS
        PITUITARY GLAND, 3800
    HEPATITIS, CHRONIC
        CIRRHOSIS, BILIARY, 3768
        IMMUNOGLOBULINS, 3762
        THYROID, 3762
    HEPATITIS, VIRAL
        MUSCULOSKELETAL SYSTEM, 3734, 3755
    INTESTINE
        ANOMALY, 3475
    JEJUNUM
        DIVERTICULUM, 3476
    LIVER DISEASE
        DUODENITIS, 3377
        GASTRITIS, 3377
        MUSCULOSKELETAL SYSTEM, 3693
    MALABSORPTION
        MUSCULOSKELETAL SYSTEM, 3522
        NERVOUS SYSTEM, 3530
    NEOPLASMS, MALIGNANT, 3840
    PANCREAS
        NEOPLASMS, MALIGNANT, 3625
    PANCREAS DISEASE
        SPLENOMEGALY, 3821
    PEPTIC ULCER
        ATHEROSCLEROSIS, 3399
    PORTAL HYPERTENSION
        HEMORRHOIDS, 3603
        SPLENOMEGALY, 3821
    REGIONAL ENTERITIS
        LYMPHATICS, 3581
        SARCOIDOSIS, 3495
    SMALL INTESTINE
        VOLVULUS, 3476
    ULCERATIVE COLITIS
        LIVER, 3617
        MALABSORPTION, 3605*
        NEOPLASMS, MALIGNANT, 3607*
        PRECANCER, 3607*
    WHIPPLES DISEASE
        SARCOIDOSIS, 3524
    ZOLLINGER-ELLISON SYNDROME, 3835*

DIURETICS
    STOMACH
        ACID SECRETION, 3404

DIVERTICULITIS
    LARGE INTESTINE
        AGE FACTORS, 3587
        SURGERY, 3589

DIVERTICULUM
    APPENDIX, 3569
    CECUM, 3591
    COLON
        AGE FACTORS, 3560
        FISTULA, 3566
        SURGERY, 3601
    DUODENUM, 3446
    ESOPHAGUS
        BLEEDING, 3334
    JEJUNUM
        DISEASES ASSOCIATED WITH, 3476
        MALABSORPTION, 3531
    STOMACH, 3361

DOWNS SYNDROME
  ANTIGEN, AUSTRALIA, 3740
  HEPATITIS, VIRAL
    TRANSMISSION, 3740

DRUG ABSORPTION
  JEJUNUM
    TOXIN, 3035
  SMALL INTESTINE
    TECHNIQUES, 3034
  STOMACH
    GASTRONE, 3082
    MOTILITY, 3030

DRUG EFFECTS ON
  ALCOHOL
    METABOLISM, 3147
    TOLERANCE, 3155
  CARBOHYDRATE
    METABOLISM, 3147
  CECUM
    MOTILITY, 3053
  FATTY ACIDS
    SCHISTOSOMIASIS, 3919
  GASTROINTESTINAL
    ENDOSCOPY, 3316
  GLUCOSE
    ABSORPTION, 3025
  ILEUM
    ION TRANSPORT, 3066
    MOTILITY, 3040*, 3063
    NERVOUS SYSTEM, 3052
  INTESTINE
    MOTILITY, 3047
  JEJUNUM
    ABSORPTION, 3022
    MOTILITY, 3067
  LIPIDS
    ABSORPTION, 3017
  LIVER
    LIPIDS, 3158
  METABOLISM
    LIPIDS, 3158
  PANCREAS
    SECRETION, 3117*, 3131
  PANCREATIC DUCT
    MOTILITY, 3131
  STOMACH
    ACID SECRETION, 3086, 3089
    HYPOXIA, 3081

DRUG-INDUCED
  HEPATOMEGALY
    ETIOLOGY, 3154

DRUG THERAPY
  STOMACH
    ULCER, 3389*

DRUG TREATMENT
  AMEBIASIS
    CHRONIC, 3911
    INTESTINE, 3913
  CHOLECYSTITIS
    ANTIBIOTICS, 3830
  CIRRHOSIS
    SUGAR, 3793*
  COLITIS
    AMEBIASIS, 3914
  DIARRHEA
    SEQUELAE, 3526
  DUODENUM
    ULCER, 3397, 3421
  GAS, INTESTINAL, 3859
  GASTRITIS, ATROPHIC
    CORTICOSTEROIDS, 3356*
  GASTROINTESTINAL TRACT
    NEOPLASMS, MALIGNANT, 3899
  HEPATITIS, VIRAL
    CORTICOSTEROIDS, 3187
  PAIN
    CHILDREN, 3885
  PANCREAS
    TRAUMA, 3638
  PANCREATITIS
    ANTIMETABOLITES, 3646*
  PEPTIC ULCER, 3400
  PERITONITIS
    ANTIBIOTICS, 3890
  STOMACH
    FOREIGN BODIES, 3367
    ULCER, 3420

DUBIN-JOHNSON SYNDROME
  ORAL CONTRACEPTIVES, 3706

DUMPING SYNDROME
  JEJUNUM
    SURGERY, 3410
  POSTURAL FACTORS, 3317

DUODENITIS, 3458
  DISEASES ASSOCIATED WITH, 3447
  LIVER DISEASE
    DISEASES ASSOCIATED WITH, 3377

DUODENUM
  SEE ALSO SMALL INTESTINE
  DIAGNOSIS
    CONTRAST MEDIA, 3295
  DIVERTICULUM, 3446
  ELECTROPHYSIOLOGY
    STOMACH, 3049
  ENDOSCOPY, 3283
    TECHNIQUES, 3294
  KINETICS, CELL
    HYDROXYUREA, 2976
  MITOSIS
    CORTICOSTEROIDS, 2994
  MORPHOLOGY
    AUTORADIOGRAPHY, 2967
  MOTILITY
    HORMONE EFFECTS ON, 3065
  NEOPLASMS, 3454, 3467
  NEOPLASMS, BENIGN, 3376, 3466
    LIPOMA, 3480
  NEOPLASMS, MALIGNANT
    GARDNERS SYNDROME, 3459
    RADIOLOGY, 3310, 3464
  PROTEIN
    CALCIUM, 3208
  SECRETION
    ACIDITY, 3288
  STOMACH
    ELECTROPHYSIOLOGY, 3049
    MUCOSA, 3435*
  TRAUMA
    CHILDREN, 3627

- TRIGLYCERIDE
  - ACID SECRETION, 3074*
- TUBERCULOSIS
  - ANEMIA, PERNICIOUS, 3470
  - MALABSORPTION, 3470
- ULCER, 3418
  - ACID SECRETION, 3386*
  - BICARBONATE SECRETION, 3393
  - BLEEDING, 3407, 3411
  - CHILDREN, 3413
  - DIAGNOSIS, 3288, 3402
  - DRUG TREATMENT, 3397, 3421
  - ENDOSCOPY, 3271
  - PERFORATION, 3395
  - RADIOLOGY, 3271
  - RECURRENCE, 3398
  - SURGERY, 3417, 3424, 3450
  - THERAPY, 3121*
  - VAGOTOMY, 3384*
- ULTRASTRUCTURE
  - ENZYMES, 2991
  - LIPIDS, 2991

DUODENUM ULCER
- SEE ALSO PEPTIC ULCER

DYSENTERY
- AMEBIASIS, 3909
- BACTERIA, 3909
  - EPIDEMIOLOGY, 3863, 3864, 3865

DYSKINESIA
- ESOPHAGUS, 3322, 3346
- GASTROINTESTINAL
  - ACUPUNCTURE, 3409
- INTESTINE
  - CONTRAST MEDIA, 3024

ECHINOCOCCOSIS
- LIVER, 3910
  - DIAGNOSIS, 3912
  - SURGERY, 3920
  - THERAPY, 3916

ECHOGRAPHY
- ASCITES
  - DIAGNOSIS, 3238*
- LIVER
  - AMEBIASIS, 3244*

ELECTROLYTE
- ABSORPTION
  - APPENDIX, 3007*
- LIVER
  - RIBOSOMES, 2973
- SECRETION
  - APPENDIX, 3007*
- STOMACH
  - MOTILITY, 3095
  - SECRETION, 3095, 3097

ELECTROPHORESIS
- BILE ACIDS
  - CHEMICAL COMPOSITION, 3434*

ELECTROPHYSIOLOGY
- CECUM
  - TEMPERATURE, 3050
- DUODENUM
  - STOMACH, 3049
- ESOPHAGUS, 3055
- GASTROINTESTINAL
  - CHILDREN, 3308
- ILEUM, 3008*
- JEJUNUM
  - ACETYLCHOLINE, 3048
  - CHOLERA, 3196*
- LARGE INTESTINE
  - CAFFEINE, 3060
- PYLORUS, 3041*
- SMALL INTESTINE, 3056
  - CIRCULATION, 3214*
  - LACTIC ACID, 3051
- STOMACH
  - ASPIRIN, 3076*
  - DUODENUM, 3049
  - ION TRANSFER, 3036
  - SECRETION, 3057
  - SUGARS, 3076*
- VAGOTOMY
  - DIAGNOSIS, 3232*

EMBRYOLOGY
- CALCIUM
  - METABOLISM, 3200*
- LIVER
  - CORTICOSTEROIDS, 2966
- PANCREAS
  - ENZYMES, 3129

EMESIS
- SEE VOMITING

EMULSIFYING AGENTS
- CHOLESTEROL
  - ABSORPTION, 3009*

ENDOCRINE SYSTEM
- SMALL INTESTINE
  - AGE FACTORS, 2987
- STOMACH
  - ANEMIA, PERNICIOUS, 3358*
  - MORPHOLOGY, 2968

ENDOSCOPY
- DUODENUM, 3283
  - TECHNIQUES, 3294
  - ULCER, 3271
- ESOPHAGUS
  - TRANQUILIZERS, 3296
- GASTROINTESTINAL
  - BLEEDING, 3297
  - COMPLICATIONS, 3293
  - DRUG EFFECTS ON, 3316
  - REVIEW, 3292
- LARGE INTESTINE
  - COMPLICATIONS, 3277
  - PERFORATION, 3277
- PANCREAS, 3314
- RECTUM
  - NEOPLASMS, MALIGNANT, 3552
  - TECHNIQUES, 3313
- STOMACH
  - ANEMIA, PERNICIOUS, 3374
  - TRANQUILIZERS, 3296
  - VAGOTOMY, 3414
- ULCERATIVE COLITIS, 3233*

- ENDOTOXIN
  - ABSORPTION
    - SHOCK, 3019
  - PEPTIC ULCER, 3381*

- ENTERECTOMY
  - BLOOD
    - CALCIUM, 3207
  - MINERALS
    - MALABSORPTION, 3511
  - SEQUELAE
    - DIARRHEA, 3526
  - SMALL INTESTINE
    - MICROORGANISMS, 3512
  - THERAPY
    - DIET, 3513
  - TRACE ELEMENT
    - MALABSORPTION, 3511

- ENTERITIS
  - SEE ALSO REGIONAL ENTERITIS
  - INFECTION, 3872
  - LIVER
    - ABSCESS, 3682
  - RADIATION
    - SEQUELAE, 3682
  - SMALL INTESTINE
    - NECROSIS, 3443

- ENTEROCOLITIS
  - CHILDREN, 3896
    - SURVIVAL, 3880
    - THERAPY, 3857

- ENTEROGASTRONE
  - STOMACH
    - SECRETION, 3103

- ENZYMES
  - BILE SALTS
    - ANALYSIS, 3126
  - BILIARY DISEASE
    - DIAGNOSIS, 3303
  - DUODENUM
    - ULTRASTRUCTURE, 2991
  - INTESTINE
    - CATECHOLAMINES, 2998
    - ISCHEMIA, 3215*
    - OBSTRUCTION, 3215*
  - JEJUNUM
    - ULTRASTRUCTURE, 2991
  - LIVER
    - ALCOHOL, 3134*, 3146
    - BIOPSY, 3259, 3307
    - GALACTOSAMINE, 3715
    - ISOLATION, 3223
    - LYSOSOMES, 3176
    - MALABSORPTION, 3695
    - MICROSOMES, 3156
    - PERFUSION, 3134*
    - PORPHYRIA, 3791
    - REGENERATION, 3138
    - SEDATIVES, 3149
    - SPECIES DIFFERENCES, 3223
    - TECHNIQUES, 3259
    - ULTRASTRUCTURE, 3132*
  - LIVER DISEASE
    - DIAGNOSIS, 3286, 3303
  - LYSOSOMES
    - ALCOHOL, 3176
  - PANCREAS
    - ALCOHOL, 3127
    - DEFICIENCY, 3522
    - DIETARY FACTORS, 3122*
    - EMBRYOLOGY, 3129
    - FOLIC ACID, 3130
    - NEONATE, 3122*
  - PROTEIN
    - INTOLERANCE, 3695
  - SMALL INTESTINE
    - CHOLECYSTOKININ, 3190*
    - MITOCHONDRIA, 3209, 3210
    - SECRETIN, 3190*
    - ULTRASTRUCTURE, 3210
  - STOMACH
    - MORPHOLOGY, 3101
    - PENTAGASTRIN, 3109

- EPIDEMIOLOGY
  - ABDOMEN
    - ABSCESS, 3845
  - APPENDICITIS
    - SURVIVAL, 3604
  - CELIAC DISEASE
    - ETHNIC FACTORS, 3507*
  - CHOLECYSTITIS
    - ETHNIC FACTORS, 3828
  - CHOLELITHIASIS
    - ETHNIC FACTORS, 3828
  - COLON
    - INFLAMMATION, 3616
  - DYSENTERY
    - BACTERIA, 3863, 3864, 3865
  - GASTROINTESTINAL
    - DISEASE, 3852
  - HEPATITIS, SERUM, 3747
  - HEPATITIS, VIRAL, 3746
    - ANTIGEN, AUSTRALIA, 3738
    - SEX FACTORS, 3757
  - PANCREATITIS, 3665
  - PARASITES AND PARASITIC DISEASE
    - CHILDREN, 3905
  - PARASITES AND PARASITIC DISEASES
    - CHILDREN, 3918
  - PEPTIC ULCER, 3427
    - ETHNIC FACTORS, 3428
    - OCCUPATIONAL FACTORS, 3426
    - SOCIOECONOMIC FACTORS, 3428
    - SURVIVAL, 3419
  - RECTUM
    - NEOPLASMS, MALIGNANT, 3553
  - SALMONELLOSIS, 3875
  - TRICHOSTRONGYLOSIS, 3908
  - ULCERATIVE COLITIS, 3609

- ESOPHAGITIS
  - BILE, 3333
  - ETIOLOGY
    - ACID SECRETION, 3332
    - BILE ACIDS, 3332

- ESOPHAGITIS, REFLUX
  - STRICTURE
    - SURGERY, 3349

- ESOPHAGUS
  - ANOMALY, 3342, 3347
  - ANOMALY, CONGENITAL, 3320

- CHEMICAL BURNS
    - CHILDREN, 3351
    - REVIEWS, 3351
    - THERAPY, 3331, 3353
- CIRCULATION, 3230
- CROHNS DISEASE, 3336
- DIVERTICULUM
    - BLEEDING, 3334
- DYSKINESIA, 3322, 3346
- ELECTROPHYSIOLOGY, 3055
- ENDOSCOPY
    - TRANQUILIZERS, 3296
- FISTULA, 3320
    - NEOPLASMS, MALIGNANT, 3341
- MORPHOLOGY, 3230
    - LYMPHATICS, 2981
    - NERVOUS SYSTEM, 3055
- MOTILITY
    - AMYLOIDOSIS, 3850
- NEOPLASMS
    - MORPHOLOGY, 3352
- NEOPLASMS, BENIGN, 3323, 3334, 3376
- NEOPLASMS, MALIGNANT, 3344
    - ANGIOGRAPHY, 3264
    - DIAGNOSIS, 3348
    - SURGERY, 3326, 3328
    - ULTRASTRUCTURE, 3319
- PERFORATION
    - TRAUMA, 3329
- REFLUX
    - PRESSURE STUDIES, 3312
    - SURGERY, 3325
- SCLERODERMA
    - THERAPY, 3350
- STENOSIS
    - SURGERY, 3324
- STRICTURE, 3338
    - DILATATION, 3330, 3340
    - REVIEWS, 3354
    - THERAPY, 3327, 3353, 3354
- TRAUMA
    - ACID SECRETION, 3104
- ULCER, 3338
    - ADHESIONS, 3337
- VARICES
    - ACHALASIA, 3343
    - BLEEDING, 3343
    - CIRRHOSIS, 3794

ESTROGENS
- CHOLINESTERASE, 3100

ETHIONINE
- LIVER
    - RIBOSOMES, 2974

ETHNIC FACTORS
- APPENDICITIS, 3593
- CELIAC DISEASE
    - EPIDEMIOLOGY, 3507*
- CHOLECYSTITIS
    - EPIDEMIOLOGY, 3828
- CHOLELITHIASIS
    - EPIDEMIOLOGY, 3828
- PEPTIC ULCER
    - EPIDEMIOLOGY, 3428

FAMILIAL FACTORS
- CIRRHOSIS
    - ANTIGEN, AUSTRALIA, 3728*
- HEPATITIS, CHRONIC
    - ANTIGEN, AUSTRALIA, 3728*
    - NEOPLASMS, MALIGNANT, 3767
- HEPATITIS, VIRAL
    - TRANSMISSION, 3758
- NEOPLASMS, MALIGNANT, 3840
- PANCREATITIS, CHRONIC
    - CALCIFICATION, 3662

FASCIOLIASIS
- BILE DUCT, 3923

FATS
- SEE LIPIDS, TRIGLYCERIDES

FATTY ACIDS
- ABSORPTION
    - BILE ACIDS, 3199*
    - SMALL INTESTINE, 3199*
- COLON
    - SECRETION, 3197*
- DRUG EFFECTS ON
    - SCHISTOSOMIASIS, 3919
- FECES
    - LIPIDS, 3212
- METABOLISM
    - ALCOHOL, 3141, 3175
    - LIVER, 3141
    - STEATORRHEA, 3501*
- STEATORRHEA
    - ETIOLOGY, 3501*

FATTY LIVER
- ALCOHOL
    - DIETARY FACTORS, 3133*
    - ETIOLOGY, 3132*
- CHEMICAL COMPOSITION
    - ALCOHOLISM, 3787
- ETIOLOGY
    - REVIEWS, 3788
- PREGNANCY, 3780
- PROTEIN
    - DEFICIENCY, 3782

FECES
- LIPIDS
    - DIETARY FACTORS, 3505*
    - FATTY ACIDS, 3212
    - STEATORRHEA, 3505*

FETOPROTEIN, ALPHA
- HEPATITIS
    - NEONATE, 3733
- LIVER
    - NEOPLASMS, MALIGNANT, 3257, 3265

FIBRINOLYSIS
- INTESTINE
    - MUCOSA, 2988
- STOMACH
    - MUCOSA, 2988

FIBROSIS
- LIVER
    - ALCOHOL, 3186
    - DIETARY FACTORS, 3186
    - RADIOISOTOPES, 3799
    - SCHISTOSOMIASIS, 3919

- FISTULA
  - BILIARY TRACT
    - AGE FACTORS, 3824
    - ILEUS, 3823
  - COLON
    - DIVERTICULUM, 3566
    - NEOPLASMS, MALIGNANT, 3566
  - ESOPHAGUS, 3320
    - NEOPLASMS, MALIGNANT, 3341

- FOLIC ACID
  - ABSORPTION
    - JEJUNUM, 3001*
    - SMALL INTESTINE, 3195*
  - MALABSORPTION
    - ETIOLOGY, 3516
    - ORAL CONTRACEPTIVES, 3516
  - METABOLISM
    - SMALL INTESTINE, 3195*
    - SPRUE, TROPICAL, 3515
  - PANCREAS
    - ENZYMES, 3130

- FOREIGN BODIES
  - GASTRECTOMY
    - SEQUELAE, 3375
  - PERITONITIS, 3836*, 3842
    - THERAPY, 3846, 3882
  - STOMACH
    - DRUG TREATMENT, 3367

- FRUCTOSE
  - INTOLERANCE
    - HEREDITARY FACTORS, 3525
  - JEJUNUM
    - DISACCHARIDASE, 3525

- GALACTOSAMINE
  - HEPATITIS, NONVIRAL
    - CIRCULATION, 3173
  - LIVER
    - ENZYMES, 3715
    - MORPHOLOGY, 3715

- GALACTOSE TOLERANCE
  - CIRRHOSIS
    - DIAGNOSIS, 3262
  - LIVER FUNCTION TESTS
    - TECHNIQUES, 3255

- GALLBLADDER
  - MOTILITY
    - NEUROHUMORAL AGENTS, 3062
  - NEOPLASMS, MALIGNANT, 3810
  - RADIOLOGY
    - GLUCAGON, 3291
    - TECHNIQUES, 3274
  - WATER
    - ABSORPTION, 3016

- GARDNERS SYNDROME
  - DISEASES ASSOCIATED WITH
    - NEOPLASMS, BENIGN, 3547
  - DUODENUM
    - NEOPLASMS, MALIGNANT, 3459

- GAS, INTESTINAL
  - AGE FACTORS, 3859
  - DRUG TREATMENT, 3859

- GASTRECTOMY
  - SEE ALSO ANTRECTOMY
  - BONE
    - MINERALS, 3781
  - CALCIUM
    - METABOLISM, 3391
  - DISEASES ASSOCIATED WITH
    - CIRCULATION, 3408
  - GLUCOSE
    - METABOLISM, 3383*
  - LIPIDS
    - ABSORPTION, 3405
  - MALABSORPTION
    - PEPTIC ULCER, 3391
  - PANCREAS FUNCTION TESTS, 3642
  - PEPTIC ULCER
    - SURGERY, 3429
  - SEQUELAE
    - FOREIGN BODIES, 3375
    - HERNIA, 3390
    - NEOPLASMS, MALIGNANT, 3372
  - SMALL INTESTINE
    - DISACCHARIDASE, 3539
    - LACTASE, 3538
  - STOMACH
    - ACID SECRETION, 3405
    - MOTILITY, 3405
  - TECHNIQUES, 3415

- GASTRIN
  - BLOOD
    - ANEMIA, PERNICIOUS, 2990
    - IMMUNOLOGY, 2990
  - IMMUNOLOGY, 3075*
  - LYMPH
    - ACID SECRETION, 3077*
  - STOMACH
    - ACID SECRETION, 3075*
    - KINETICS, CELL, 2969
    - MORPHOLOGY, 2968
    - NEOPLASMS, MALIGNANT, 3357*

- GASTRITIS
  - BIOPSY
    - MORPHOLOGY, 3378
  - LIVER DISEASE
    - DISEASES ASSOCIATED WITH, 3377
  - PEPTIC ULCER
    - MORPHOLOGY, 3392

- GASTRITIS, ATROPHIC
  - CIRRHOSIS
    - DISEASES ASSOCIATED WITH, 3779*
  - DRUG TREATMENT
    - CORTICOSTEROIDS, 3356*

- GASTRITIS, EROSIVE
  - MORPHOLOGY, 3368

- GASTRITIS, HYPERTROPHIC
  - DIAGNOSIS, 3364

- GASTROENTERITIS
  - BACTERIA
    - TRANSMISSION, 3886
  - CHILDREN
    - DEHYDRATION, 3853
  - DISEASES ASSOCIATED WITH
    - ALLERGY, 3520

  - PROTEIN-LOSING ENTEROPATHY, 3520

- GASTROINTESTINAL
  - ABSORPTION
    - TECHNIQUES, 3018
  - ANOMALY
    - CHILDREN, 3877, 3892
  - BLEEDING
    - ANALGESICS, 3860
    - ANTIINFLAMMATORY AGENTS, 3224
    - DIAGNOSIS, 3268, 3879
    - DISEASES ASSOCIATED WITH, 3453
    - ENDOSCOPY, 3297
    - ETIOLOGY, 3898
    - INTUBATION, 3268
    - NERVOUS SYSTEM, 3888
    - TECHNIQUES, 3224
    - THERAPY, 3871
  - DIAGNOSIS
    - RADIOIMMUNOASSAY, 3290
  - DISEASES
    - ANEMIA, 3901
    - DIETARY FACTORS, 3868
    - EPIDEMIOLOGY, 3852
    - NERVOUS SYSTEM, 3887
    - PRIMATES, 3219
    - REVIEWS, 3852
  - DYSKINESIA
    - ACUPUNCTURE, 3409
  - ELECTROPHYSIOLOGY
    - CHILDREN, 3308
  - ENDOSCOPY
    - COMPLICATIONS, 3293
    - DRUG EFFECTS ON, 3316
    - REVIEW, 3292
  - MALABSORPTION
    - VITAMIN E, 3509*
  - MOTILITY
    - HORMONE EFFECTS ON, 3061
    - REVIEWS, 3069
  - MUCOSA
    - DISEASES, 3486*
  - NEOPLASMS, MALIGNANT
    - DRUG TREATMENT, 3899
  - PERFORATION
    - CHILDREN, 3870
    - ILEUS, 3394
  - RADIOLOGY
    - COMPLICATIONS, 3893
  - SECRETION
    - NICOTINE, 3084
    - REVIEWS, 3084

- GASTRONE
  - STOMACH
    - ACID SECRETION, 3082
    - CIRCULATION, 3082
    - DRUG ABSORPTION, 3082

- GLUCAGON
  - BLOOD
    - CALCIUM, 3106
  - GALLBLADDER
    - RADIOLOGY, 3291
  - STOMACH
    - ACID SECRETION, 3106

- GLUCOSE
  - ABSORPTION
    - DRUG EFFECTS ON, 3025
    - JEJUNUM, 3025
    - SMALL INTESTINE, 3006*
  - INTESTINE
    - ISCHEMIA, 3221
  - MALABSORPTION
    - REVIEWS, 3442
  - METABOLISM
    - BACTERIA, 3003*
    - GASTRECTOMY, 3383*
    - PANCREATITIS, CHRONIC, 3670
    - PYLOROPLASTY, 3383*
    - SMALL INTESTINE, 3003*
  - PEPTIC ULCER
    - SURGERY, 3424
  - SMALL INTESTINE
    - ABSORPTION, 3026

- GLYCOGEN
  - LIVER
    - DIETARY FACTORS, 2971
    - PERFUSION, 2971

- GLYCOPROTEINS
  - BLOOD
    - HEPATITIS, CHRONIC, 3777
  - CHEMICAL COMPOSITION, 2992
  - PHYSICAL PROPERTIES, 2992
  - STOMACH
    - SECRETION, 2992

- HALOGENATED HYDROCARBONS
  - HEPATITIS, NONVIRAL, 3727
  - LIVER
    - NECROSIS, 3168

- HAMARTOMA
  - COLON
    - VOLVULUS, 3546

- HEMANGIOMA
  - ILEUM
    - BLEEDING, 3445

- HEMOCHROMATOSIS
  - DISEASES ASSOCIATED WITH
    - PITUITARY GLAND, 3800
  - LIVER
    - SCANNING, SCINTILLATION, 3301

- HEMOLYSIS
  - HEPATITIS, VIRUS
    - LIVER FUNCTION TESTS, 3751

- HEMORRHAGE
  - SEE BLEEDING

- HEMORRHOIDS
  - PORTAL HYPERTENSION
    - DISEASES ASSOCIATED WITH, 3603

- HEPATECTOMY

- LIVER
  - KINETICS, CELL, 2979
- NUCLEIC ACIDS
  - SYNTHESIS, 3136*, 3138
- TECHNIQUES, 3153

HEPATITIS
- ANTIGEN, AUSTRALIA
  - NEONATE, 3732, 3733
- FETOPROTEIN, ALPHA
  - NEONATE, 3733
- RADIATION, 3717
- VIRUS
  - ULTRASTRUCTURE, 3759

HEPATITIS, CHRONIC
- ANTIGEN, AUSTRALIA
  - FAMILIAL FACTORS, 3728*
- BLOOD
  - GLYCOPROTEINS, 3777
  - IMMUNOGLOBULINS, 3774
- DIAGNOSIS, 3775
- DISEASES ASSOCIATED WITH
  - CIRRHOSIS, BILIARY, 3768
  - IMMUNOGLOBULINS, 3762
  - THYROID, 3762
- ETIOLOGY
  - TRANQUILIZERS, 3766
- HEPATITIS, VIRAL
  - PROGNOSIS, 3736
- IMMUNOSUPPRESSION, 3770, 3771, 3772
- LIVER
  - ULTRASTRUCTURE, 3754
- MORPHOLOGY, 3773
- NEOPLASMS, MALIGNANT
  - FAMILIAL FACTORS, 3767
- REVIEWS, 3764
- SEQUELAE
  - ANEURYSM, 3763
  - UROGENITAL SYSTEM, 3763
- SIMULATION, 3188
- SPLENECTOMY
  - LIVER FUNCTION TESTS, 3769
- SULFOBROMOPHTHALEIN, 3249*

HEPATITIS, NONVIRAL
- ALCOHOLISM
  - DIETARY FACTORS, 3790
- ANTIHYPERTENSIVE AGENTS, 3712
- ETIOLOGY
  - ANTIBACTERIALS, 3724
- GALACTOSAMINE
  - CIRCULATION, 3173
- HALOGENATED HYDROCARBONS, 3727
- LIVER
  - CHEMICAL COMPOSITION, 3792
- PORTAL HYPERTENSION
  - CIRCULATION, 3785

HEPATITIS, SERUM
- EPIDEMIOLOGY, 3747
- LIVER
  - ULTRASTRUCTURE, 3754
- PROGNOSIS
  - ANTIGEN, AUSTRALIA, 3731
- TRANSMISSION, 3756

HEPATITIS, VIRAL
- ANTIGEN, AUSTRALIA, 3741
  - EPIDEMIOLOGY, 3738
  - TRANSMISSION, 3728*
- CLOTTING
  - RADIOISOTOPES, 3730*
- DIAGNOSIS
  - LIVER FUNCTION TESTS, 3298
- DISEASES ASSOCIATED WITH
  - MUSCULOSKELETAL SYSTEM, 3734, 3755
- DRUG TREATMENT
  - CORTICOSTEROIDS, 3187
- EPIDEMIOLOGY, 3746
  - SEX FACTORS, 3757
- ETIOLOGY, 3750
  - IMMUNOLOGY, 3744
  - REVIEWS, 3752
- IMMUNOLOGY, 3743, 3745, 3753, 3761
- LEUKOCYTES, 3737
- LIVER
  - MORPHOLOGY, 3760
- MARKER STUDIES, 3309
- MORPHOLOGY, 3742
- PROGNOSIS
  - HEPATITIS, CHRONIC, 3736
- REVIEWS, 3735
- TRANSMISSION, 3739
  - ANTIGEN, AUSTRALIA, 3729*
  - DOWNS SYNDROME, 3740
  - FAMILIAL FACTORS, 3758
  - PERFUSION, 3749
  - TRANSFUSION, 3748
- ULTRASTRUCTURE, 3742

HEPATOMEGALY
- DRUG-INDUCED
  - ETIOLOGY, 3154

HEREDITARY FACTORS
- FRUCTOSE
  - INTOLERANCE, 3525

HERNIA
- GASTRECTOMY
  - SEQUELAE, 3390
- SURGERY
  - TECHNIQUES, 3460

HERNIA, HIATUS, 3345
- ETIOLOGY
  - CONNECTIVE TISSUE, 3355
- REVIEWS, 3321
- SURGERY
  - CHILDREN, 3339

HETEROTOPIA
- STOMACH
  - MUCOSA, 3435*

HIRSCHSPRUNGS DISEASE
- MOTILITY
  - NERVOUS CONTROL, 3582
  - NEUROHUMORAL AGENTS, 3582
- NEONATE, 3599
- PRESSURE STUDIES, 3279
- REVIEWS, 3570
- SURGERY, 3565

HISTAMINE
- BILE
  - SECRETION, 3162

- HORMONE
  - CALCIUM
    - METABOLISM, 3222
  - CHEMICAL COMPOSITION
    - SMALL INTESTINE, 3205
  - LIVER
    - NEOPLASMS, MALIGNANT, 3678
  - METABOLISM
    - PORPHYRIA, 3692
  - PANCREATITIS
    - ETIOLOGY, 3653
  - PITUITARY GLAND
    - CHEMICAL COMPOSITION, 3061
    - ISOLATION, 3061
  - SMALL INTESTINE
    - METABOLISM, 3192*
    - ULTRASTRUCTURE, 3192*
  - THYROID
    - LIVER, 3183
    - METABOLISM, 3183

- HORMONE CONTROL
  - LIVER
    - KINETICS, CELL, 2979
  - STOMACH
    - MOTILITY, 3205

- HORMONE EFFECTS ON
  - COLON
    - MOTILITY, 3054
  - DUODENUM
    - MOTILITY, 3065
  - GASTROINTESTINAL
    - MOTILITY, 3061
  - ILEUM
    - MOTILITY, 3042*
  - INTESTINE
    - MOTILITY, 3047
  - PANCREAS
    - SECRETION, 3111
  - PEPTIC ULCER
    - ACID SECRETION, 3379*
  - SMALL INTESTINE
    - ABSORPTION, 3021
  - STOMACH
    - ACID SECRETION, 3111
    - MORPHOLOGY, 2964*

- HYALIN
  - LIVER
    - MORPHOLOGY, 3689
    - ULTRASTRUCTURE, 3689

- HYDROXYUREA
  - DUODENUM
    - KINETICS, CELL, 2976

- HYMENOLEPIASIS
  - SMALL INTESTINE, 3904

- HYPERBILIRUBINEMIA
  - NAPHTHYLISOTHIOCYANATE, ALPHA
    - ANTIMETABOLITES, 3704
  - NEONATE
    - PHOTOTHERAPY, 3701*

- HYPERCHLORHYDRIA
  - SEE ALSO ACID SECRETION
  - SMALL INTESTINE
    - SURGERY, 3080
  - STOMACH
    - ACID SECRETION, 3360
    - PEPSIN, 3360

- HYPEROXIA
  - STOMACH
    - SECRETION, 3079*

- HYPERPLASIA
  - COLON
    - LYMPHATICS, 3542*, 3581
  - LIVER
    - ETIOLOGY, 3797
    - IMMUNOSUPPRESSION, 3136*
    - RADIOISOTOPES, 3795

- HYPERTENSION
  - CIRRHOSIS
    - SURGERY, 3798

- HYPOCHLORHYDRIA
  - SEE ALSO ACID SECRETION

- HYPOXIA
  - STOMACH
    - ACID SECRETION, 3081
    - DRUG EFFECTS ON, 3081
    - PEPSIN SECRETION, 3081

- ICTERUS
  - SEE JAUNDICE

- ILEUM
  - SEE ALSO SMALL INTESTINE
  - ANOMALY, CONGENITAL
    - PERFORATION, 3448
  - CARCINOIDS
    - METASTASIS, 3477
  - ELECTROPHYSIOLOGY, 3008*
  - HEMANGIOMA
    - BLEEDING, 3445
  - ION TRANSPORT
    - CHLORIDE, 3012*
    - DRUG EFFECTS ON, 3066
    - NEUROHUMORAL AGENTS, 3066
    - POTASSIUM, 3066
  - MORPHOLOGY, 2999
  - MOTILITY
    - ACETYLCHOLINE, 3042*
    - DRUG EFFECTS ON, 3040*, 3063
    - HORMONE EFFECTS ON, 3042*
    - NUCLEOTIDES, 3040*
    - TEMPERATURE, 3040*
  - NEOPLASMS, MALIGNANT
    - MORPHOLOGY, 3469
  - NERVOUS SYSTEM
    - DRUG EFFECTS ON, 3052
  - PERFORATION
    - SALMONELLOSIS, 3457
  - PERISTALSIS
    - PROSTAGLANDIN, 3046
  - SODIUM
    - ABSORPTION, 3008*
  - SURGERY
    - DIARRHEA, 3497
  - ULTRASTRUCTURE, 2999

- ILEUS

- BILIARY TRACT
  - FISTULA, 3823
- CECUM
  - PERFORATION, 3544
- DIAGNOSIS, 3438, 3440
- ETIOLOGY, 3438, 3440
- GASTROINTESTINAL
  - PERFORATION, 3394
- MECONIUM
  - COMPLICATIONS, 3624
  - SURVIVAL, 3624
  - THERAPY, 3024
- SIMULATION
  - ANEURYSM, 3439

IMMUNOGLOBULINS
- BLOOD
  - CIRRHOSIS, 3774, 3802
  - HEPATITIS, CHRONIC, 3774
- DEFICIENCY
  - ULCERATIVE ENTERITIS, 3502*
- HEPATITIS, CHRONIC
  - DISEASES ASSOCIATED WITH, 3762
- LIVER DISEASE, 3687
- SMALL INTESTINE, 2980
  - MICROORGANISMS, 3432*
- ULCERATIVE COLITIS, 3619
- ULCERATIVE ENTERITIS
  - ETIOLOGY, 3502*

IMMUNOLOGY
- AMEBIASIS
  - DIAGNOSIS, 3275
- ANTIGEN, AUSTRALIA, 3245*
- BILIARY TRACT
  - OBSTRUCTION, 3246*
- BLOOD
  - GASTRIN, 2990
- CELIAC DISEASE, 3506*
- CHOLERA
  - PREVENTION, 3897
- COLITIS
  - AMEBIASIS, 3907
- COLON
  - NEOPLASMS, MALIGNANT, 3540*
- CROHNS DISEASE, 3484*, 3485*, 3488*
- GASTRIN, 3075*
- HEPATITIS, VIRAL, 3743, 3745, 3753, 3761
  - ETIOLOGY, 3744
- INTESTINE
  - TRANSPLANTATION, 3436*
- KWASHIORKOR, 3529
- LIVER DISEASE, 3686, 3776
- NEOPLASMS, MALIGNANT
  - REVIEWS, 3837
- PANCREAS DISEASE
  - REVIEWS, 3629
- REGIONAL ENTERITIS, 3606*
- SMALL INTESTINE
  - WHIPPLES DISEASE, 3433*
- ULCERATIVE COLITIS, 3484*, 3606*, 3608*

IMMUNOSUPPRESSION
- HEPATITIS, CHRONIC, 3770, 3771, 3772
- LIVER
  - HYPERPLASIA, 3136*
- NUCLEIC ACIDS
  - SYNTHESIS, 3136*
- REGIONAL ENTERITIS
  - PANCREATITIS, 3666

INCONTINENCE
- ANORECTUM
  - SPHINCTER, 3562
- PRESSURE STUDIES, 3279

INFECTION
- ENTERITIS, 3872

INFECTION, BACTERIA
- LIVER
  - MORPHOLOGY, 3710
- LIVER FUNCTION TESTS, 3710

INFECTION, FUNGUS
- LIVER, 3711

INFECTION, VIRUS
- PANCREATITIS, 3664

INFLAMMATION
- COLON
  - BIOPSY, 3618
  - EPIDEMIOLOGY, 3616
- INTESTINE
  - ISCHEMIA, 3584

INJURY
- CHEMICAL BURNS
  - ACID, 3889
- LIVER
  - NAPHTHYLISOTHIOCYANATE, ALPHA, 3172
  - NITROSAMINE, 2970
  - PHYSICAL FACTORS, 3849
  - ULTRASTRUCTURE, 2970
- SMALL INTESTINE
  - RADIATION, 2986

INSULIN
- ABSORPTION
  - SMALL INTESTINE, 3028
- KWASHIORKOR, 3528
- PANCREAS
  - SECRETION, 3120*
- STOMACH
  - ACID SECRETION, 3385*

INTESTINE
- SEE ALSO SMALL INTESTINE
- ABSORPTION
  - CATECHOLAMINES, 2998
- AMEBIASIS
  - DRUG TREATMENT, 3913
  - REVIEWS, 3906
- AMINO ACIDS
  - SECRETION, 3031
- ANASTOMOSIS
  - CHEMOTHERAPY, 3472
  - THERAPY, 3474
- ANOMALY
  - DISEASES ASSOCIATED WITH, 3475
- ATRESIA
  - SIMULATION, 3451
- BACTERIA
  - METABOLISM, 3231

  - CARCINOIDS
    - DIAGNOSIS, 3284
  - DYSKINESIA
    - CONTRAST MEDIA, 3024
  - ENZYMES
    - CATECHOLAMINES, 2998
  - INFLAMMATION
    - ISCHEMIA, 3584
  - INTUSSUCEPTION, 3468
  - ION TRANSPORT
    - SODIUM, 3002*
  - ISCHEMIA
    - ENZYMES, 3215*
    - GLUCOSE, 3221
    - THERAPY, 3221
  - LYMPHANGIECTASIA
    - TRIGLYCERIDE, MEDIUM CHAIN, 3532
  - MORPHOLOGY
    - ANOMALY, CONGENITAL, 3452
  - MOTILITY
    - CALCIUM, 3047
    - CYCLIC ADENOSINE MONOPHOSPHATE, 3047
    - DRUG EFFECTS ON, 3047
    - HORMONE EFFECTS ON, 3047
  - MUCOSA
    - FIBRINOLYSIS, 2988
  - NECROSIS
    - THROMBOSIS, 3564
  - OBSTRUCTION
    - ENZYMES, 3215*
  - PARASITES AND PARASITIC DISEASES
    - NERVOUS SYSTEM, 3922
  - STEROL
    - CHEMICAL COMPOSITION, 3204
    - METABOLISM, 3204
    - SPECIES DIFFERENCES, 3204
  - TRANSPLANTATION, 3482
    - IMMUNOLOGY, 3436*
    - REJECTION, 3436*
  - ULTRASTRUCTURE
    - CATECHOLAMINES, 2998

- INTOLERANCE
  - FRUCTOSE
    - HEREDITARY FACTORS, 3525
  - PROTEIN
    - ENZYMES, 3695
    - NEONATE, 3521

- INTRINSIC FACTOR
  - STOMACH
    - SECRETION, 3092
  - TECHNIQUES, 3092

- INTUBATION
  - GASTROINTESTINAL
    - BLEEDING, 3268

- INTUSSUCEPTION
  - INTESTINE, 3468

- ION TRANSPORT
  - CALCIUM
    - SUGAR, 3020
  - CECUM
    - CALCIUM, 3053
  - ILEUM
    - CHLORIDE, 3012*
    - DRUG EFFECTS ON, 3066
    - NEUROHUMORAL AGENTS, 3066
    - POTASSIUM, 3066
  - INTESTINE
    - SODIUM, 3002*
  - JEJUNUM
    - CALCIUM, 3023
    - CHOLECYSTOKININ, 3004*
    - CHOLERA, 3196*
    - SECRETION, 3004*
  - LIVER
    - BILE ACIDS, 3163
    - CONTRAST MEDIA, 3163
    - MEMBRANE, 3029
    - MICROSOMES, 3139
  - PANCREAS
    - SECRETION, 3118*
  - STOMACH
    - BILE ACIDS, 3382*
    - ELECTROPHYSIOLOGY, 3036
    - SODIUM, 3072*

- IRRITABLE COLON
  - MOTILITY
    - CHOLECYSTOKININ, 3592

- ISCHEMIA
  - COLITIS
    - DISEASES ASSOCIATED WITH, 3583
  - INTESTINE
    - ENZYMES, 3215*
    - GLUCOSE, 3221
    - INFLAMMATION, 3584
    - THERAPY, 3221

- ISOENZYMES
  - LIVER
    - ISOLATION, 3157
    - TISSUE CULTURE, 3164
    - ULTRASTRUCTURE, 3157
  - LIVER DISEASE
    - DIAGNOSIS, 3258
  - PHOSPHATASE, ALKALINE
    - NEOPLASMS, MALIGNANT, 3471

- ISOMALTASE
  - DEFICIENCY
    - CARBOHYDRATE, 3508*

- JAUNDICE
  - DIAGNOSIS
    - COMPUTERS, 3703
    - LIPOPROTEINS, 3285
    - RADIOISOTOPES, 3702
  - LIVER
    - AMYLOIDOSIS, 3683

- JAUNDICE, OBSTRUCTIVE
  - ANGIOGRAPHY
    - TECHNIQUES, 3234*
  - CHOLESTEROL
    - SYNTHESIS, 3135*
  - DIAGNOSIS
    - NEOPLASMS, MALIGNANT, 3631
    - TECHNIQUES, 3270
  - ETIOLOGY

- ANEURYSM, 3811
- RADIOLOGY
  - TECHNIQUES, 3270

JEJUNUM
- SEE ALSO SMALL INTESTINE
- ABSORPTION
  - DRUG EFFECTS ON, 3022
- ANTICOAGULANTS
  - ABOSRPTION, 3032
- BILIRUBIN
  - ABSORPTION, 3013
- DISACCHARIDASE
  - DIABETES, 3518
  - FRUCTOSE, 3525
- DIVERTICULUM
  - DISEASES ASSOCIATED WITH, 3476
  - MALABSORPTION, 3531
- DRUG ABSCRPTION
  - TOXIN, 3035
- ELECTROPHYSIOLOGY
  - ACETYLCHOLINE, 3048
  - CHOLERA, 3196*
- FOLIC ACID
  - ABSORPTION, 3001*
- GLUCOSE
  - ABSORPTION, 3025
- ION TRANSPORT
  - CALCIUM, 3023
  - CHOLECYSTCKININ, 3004*
  - CHOLERA, 3196*
  - SECRETION, 3004*
- KINETICS, CELL, 2977
- MORPHOLOGY
  - AUTORADIOGRAPHY, 2967
- MOTILITY
  - DRUG EFFECTS ON, 3067
- NEOPLASMS, MALIGNANT
  - MORPHOLOGY, 3469
  - PHOSPHATASE, ALKALINE, 3471
- SECRETION
  - CHOLERA, 3211
- SURGERY
  - DUMPING SYNDROME, 3410
- TELANGIECTASIA
  - BLEEDING, 3453
- ULCER, 3398
  - ANTIINFLAMMATORY AGENTS, 3481
  - STRICTURE, 3481
- ULTRASTRUCTURE
  - CELIAC DISEASE, 3506*
  - ENZYMES, 2991
  - LIPIDS, 2991

KINETICS
- BILE ACIDS
  - SYNTHESIS, 3182
- CELLS
  - SMALL INTESTINE, 3203
  - VITAMIN D, 3203
- CHEMORECEPTION
  - ACIDITY, 3229
- LIVER
  - METABOLISM, 3165
- PANCREAS
  - SECRETION, 3117*
- SULFOBROMOPHTHALEIN
  - BILIARY DISEASE, 3263
  - LIVER DISEASE, 3263

KINETICS, CELL
- COLON, 2977
- DUODENUM
  - HYDROXYUREA, 2976
- JEJUNUM, 2977
- LIVER
  - HEPATECTOMY, 2979
  - HORMONE CONTROL, 2979
- SMALL INTESTINE
  - SURGERY, 2983
- STOMACH, 2977
  - GASTRIN, 2969

KININS
- LIVER DISEASE, 3688

KWASHIORKOR
- CONSTITUTIONAL FACTORS, 3537
- IMMUNOLOGY, 3529
- INSULIN, 3528
- PSYCHOLOGICAL FACTORS, 3536

LACTASE
- SEE ALSO DISACCHARIDASE
- SMALL INTESTINE
  - GASTRECTOMY, 3538

LACTASE DEFICIENCY
- DIAGNOSIS
  - LACTOSE TOLERANCE, 3261

LACTIC ACID
- SMALL INTESTINE
  - ELECTROPHYSIOLOGY, 3051

LACTOSE TOLERANCE
- LACTASE DEFICIENCY
  - DIAGNOSIS, 3261

LAMBLIASIS
- SEE GIARDIASIS

LARGE INTESTINE
- SEE ALSO INTESTINE, APPENDIX, CECUM, COLON, RECTUM, ANUS, SIGMOID
- DIVERTICULITIS
  - AGE FACTORS, 3587
  - SURGERY, 3589
- ELECTROPHYSIOLOGY
  - CAFFEINE, 3060
- ENDOSCOPY
  - COMPLICATIONS, 3277
- MORPHOLOGY
  - RADIOLOGY, 3473
- MOTILITY
  - CAFFEINE, 3060
  - LAXATIVES, 3043*
  - NERVOUS CONTROL, 3043*, 3064
- NEOPLASMS, MALIGNANT, 3549, 3840
  - BLEEDING, 3282
  - DIAGNOSIS, 3282
  - METASTASIS, 3596
  - RADIATION, 3541*
- PERFORATION
  - CONTRAST MEDIA, 3598
  - ENDOSCOPY, 3277
  - PERITONITIS, 3598
- TUBERCULOSIS
  - OBSTRUCTION, 3550

- LAXATIVES
  - LARGE INTESTINE
    - MOTILITY, 3043*
  - LIVER INJURY, 3719

- LEPROSY
  - LIVER
    - MORPHOLOGY, 3721

- LEUKEMIA
  - COMPLICATIONS
    - ANORECTUM, 3579

- LEUKOCYTES
  - HEPATITIS, VIRAL, 3737

- LIPIDS
  - ABSORPTION
    - DRUG EFFECTS ON, 3017
    - GASTRECTOMY, 3405
    - MALNUTRITION, 3517
    - REVIEWS, 3027
  - DUODENUM
    - ULTRASTRUCTURE, 2991
  - FECES
    - DIETARY FACTORS, 3505*
    - FATTY ACIDS, 3212
    - STEATORRHEA, 3505*
  - JEJUNUM
    - ULTRASTRUCTURE, 2991
  - LIVER
    - AMINO ACIDS, 2972
    - DIETARY FACTORS, 2972
    - DRUG EFFECTS ON, 3158
    - SECRETION, 3240*
  - MALABSORPTION
    - CELIAC DISEASE, 3504*
  - METABOLISM
    - ALCOHOL, 3198*
    - DRUG EFFECTS ON, 3158
    - VITAMIN K, 3166

- LIPOMA
  - DUODENUM
    - NEOPLASMS, BENIGN, 3480

- LIPOPROTEINS
  - JAUNDICE
    - DIAGNOSIS, 3285
  - METABOLISM
    - ALCOHOL, 3198*

- LIVER
  - ABSCESS, 3708*, 3921
    - AMEBIASIS, 3915
    - ENTERITIS, 3682
    - NEONATE, 3674
    - SCANNING, SCINTILLATION, 3237*, 3239*
  - ALCOHOL
    - METABOLISM, 3150, 3177
  - ALDEHYDES
    - METABOLISM, 3160
  - AMEBIASIS
    - ECHOGRAPHY, 3244*
    - SCANNING, SCINTILLATION, 3244*
  - AMINO ACIDS
    - METABOLISM, 3134*, 3671*
  - AMYLOIDOSIS
    - JAUNDICE, 3683
  - ANGIOGRAPHY
    - CIRRHOSIS, 3260
  - ANOMALY
    - CIRCULATION, 3797
  - ANOMALY, CONGENITAL
    - BILIARY TRACT, 3681
  - ANTIGEN, CARCINOEMBRYONIC
    - CIRRHOSIS, 3805
  - BILIARY TRACT
    - DILATATION, 3829
  - BIOPSY
    - ENZYMES, 3259, 3307
    - PSORIASIS, 3675
    - SALMONELLOSIS, 3714
    - SARCOIDOSIS, 3713
    - TUBERCULOSIS, 3713
  - CHEMICAL COMPOSITION
    - HEPATITIS, NONVIRAL, 3792
    - SEDATIVES, 3149
  - CHOLESTEROL
    - SYNTHESIS, 3135*, 3170, 3174
  - CHOLINE
    - METABOLISM, 3177
  - CIRCULATION
    - CIRRHOSIS, 3225
    - MORPHOLOGY, 3000
    - RADIOISOTOPES, 3799
  - COENZYMES
    - ALCOHOL, 3175
  - CYST
    - SCANNING, SCINTILLATION, 3239*
  - DIAGNOSIS
    - DISEASE , 3256
  - ECHINOCOCCOSIS, 3910
    - DIAGNOSIS, 3912
    - SURGERY, 3920
    - THERAPY, 3916
  - EMBRYOLOGY
    - CORTICOSTEROIDS, 2966
  - ENZYMES
    - ALCOHOL, 3134*, 3146
    - GALACTOSAMINE, 3715
    - ISOLATION, 3223
    - MALABSORPTION, 3695
    - PORPHYRIA, 3791
    - SEDATIVES, 3149
    - SPECIES DIFFERENCES, 3223
    - TECHNIQUES, 3259
  - FATTY ACIDS
    - METABOLISM, 3141
  - FIBROSIS
    - ALCOHOL, 3186
    - DIETARY FACTORS, 3186
    - RADIOISOTOPES, 3799
    - SCHISTOSOMIASIS, 3919
  - GLYCOGEN
    - DIETARY FACTORS, 2971
    - PERFUSION, 2971
  - HYPERPLASIA
    - ETIOLOGY, 3797
    - IMMUNOSUPPRESSION, 3136*
    - RADIOISOTOPES, 3795
  - INFECTION, FUNGUS, 3711
  - INJURY
    - NAPHTHYLISOTHIOCYANATE, ALPHA, 3172
    - NITROSAMINE, 2970
    - PHYSICAL FACTORS, 3849

  - ULTRASTRUCTURE, 2970
- ION TRANSPORT
  - BILE ACIDS, 3163
  - CONTRAST MEDIA, 3163
- ISOENZYMES
  - ISOLATION, 3157
- KINETICS, CELL
  - HEPATECTOMY, 2979
  - HORMONE CONTROL, 2979
- LIPIDS
  - AMINO ACIDS, 2972
  - DIETARY FACTORS, 2972
  - DRUG EFFECTS ON, 3158
- LYSOSOMES
  - ENZYMES, 3176
  - PHOSPHATASE, ACID, 3167
- MEMBRANE
  - ION TRANSPORT, 3029
- METABOLISM
  - ALCOHOL, 3165
  - FEEDING, 3165
  - KINETICS, 3165
- METASTASIS
  - CHEMOTHERAPY, 3596
- MICROSOMES
  - DETOXIFICATION, 3169
  - ENZYMES, 3156
  - ION TRANSPORT, 3139
  - TOXICITY, 3169
  - VITAMIN K, 3166
- MORPHOLOGY
  - CORTICOSTEROIDS, 2966
  - GALACTOSAMINE, 3715
  - HEPATITIS, VIRAL, 3760
  - HYALIN, 3689
  - INFECTION, BACTERIA, 3710
  - LEPROSY, 3721
- NECROSIS
  - AROMATIC HYDROCARBONS, 3168
  - CIRCULATION, 2984
  - HALOGENATED HYDROCARBONS, 3168
  - MORPHOLOGY, 2984
  - PREVENTION, 3145
  - SHUNT, 3145
- NEOPLASMS
  - SCANNING, SCINTILLATION, 3237*
- NEOPLASMS, MALIGNANT, 3676
  - FETOPROTEIN, ALPHA, 3257, 3265
  - HORMONE, 3678
  - RADIOLOGY, 3267
  - SCANNING, SCINTILLATION, 3239*
  - STEROID, 3672*
  - SURGERY, 3680
- PERFUSION, 3684
  - ACIDITY, 3134*
  - ENZYMES, 3134*
  - LIVER FUNCTION TESTS, 3697
- POLYCYCLIC HYDROCARBONS
  - METABOLISM, 3143
- PORPHYRIA
  - MORPHOLOGY, 3690
  - STEROID, 3692
- REGENERATION
  - ENZYMES, 3138
- RIBOSOMES
  - ANTIBIOTICS, 2974
  - CARBON TETRACHLORIDE, 2974
  - DIETARY FACTORS, 2975
  - ELECTROLYTE, 2973
  - ETHIONINE, 2974
  - PROTEIN, 2975
- SARCOIDOSIS
  - PORTAL HYPERTENSION, 3677
- SCANNING, SCINTILLATION
  - CIRCULATION, 3302
  - HEMOCHROMATOSIS, 3301
  - TECHNIQUES, 3289, 3305
- SCHISTOSOMIASIS, 3917
- SECRETION
  - LIPIDS, 3240*
  - TECHNIQUES, 3240*
- STEROL
  - METABOLISM, 3142
- SYPHILIS
  - MORPHOLOGY, 3723
- THYROID
  - HORMONE, 3183
- TISSUE CULTURE
  - BILE ACIDS, 3164
  - CORTICOSTEROIDS, 2966
  - ISOENZYMES, 3164
  - MORPHOLOGY, 3164
- TOXICITY
  - ALKLOIDS, 3156
  - INHIBITION, 3156
- TRANSPLANTATION, 3685, 3820
  - CIRCULATION, 3226
  - REJECTION, 3159
  - SHUNT, 3226
  - SURVIVAL, 3159
  - TECHNIQUES, 3152
- TRAUMA, 3705
- ULCERATIVE COLITIS
  - DISEASES ASSOCIATED WITH, 3617
- ULTRASTRUCTURE
  - BERYLLIUM, 3161
  - CHEMICAL COMPOSITION, 3184
  - CHOLESTASIS, 3184
  - ENZYMES, 3132*
  - HEPATITIS, CHRONIC, 3754
  - HEPATITIS, SERUM, 3754
  - HYALIN, 3689
  - ISOENZYMES, 3157
  - LIVER DISEASE, ALCOHOLIC, 3783
  - NIEMANN-PICK DISEASE, 3696
  - POLYCYCLIC HYDROCARBONS, 3144
  - REGENERATION, 3161
  - SEDATIVES, 3148, 3149
  - TECHNIQUES, 2997

LIVER DISEASE
- ANTIGEN, AUSTRALIA
  - TECHNIQUES, 3299
- AUTOIMMUNITY
  - REVIEWS, 3765
- BILE ACIDS
  - CHEMICAL COMPOSITION, 3694
- BLOOD
  - PROTEIN, 3778
- CHEMICAL COMPOSITION
  - ALCOHOLISM, 3787
- DIAGNOSIS
  - ENZYMES, 3286, 3303
  - ISOENZYMES, 3258
  - RADIOISOTOPES, 3300
  - SULFOBROMOPHTHALEIN, 3300
- DISEASES ASSOCIATED WITH
  - DUODENITIS, 3377

    - GASTRITIS, 3377
    - MUSCULOSKELETAL SYSTEM, 3693
  - IMMUNOGLOBULINS, 3687
  - IMMUNOLOGY, 3686, 3776
  - KININS, 3688
  - LIVER FUNCTION TESTS
    - PHYSICAL ACTIVITY, 3700
  - SULFOBROMOPHTHALEIN
    - KINETICS, 3263
  - THERAPY
    - PHOSPHOLIPID, 3698
  - VITAMIN E
    - MALABSORPTION, 3509*

- LIVER DISEASE, ALCOHOLIC
  - ANTIGEN, CARCINOEMBRYONIC, 3784
  - LIVER
    - ULTRASTRUCTURE, 3783
  - PORTAL HYPERTENSION
    - CIRCULATION, 3785

- LIVER FUNCTION TESTS
  - ANTIBIOTICS, 3716
  - ANTIDEPRESSANTS, 3722
  - COENZYMES
    - AGE FACTORS, 3151
  - GALACTOSE TOLERANCE
    - TECHNIQUES, 3255
  - HEPATITIS, CHRONIC
    - SPLENECTOMY, 3769
  - HEPATITIS, VIRAL
    - DIAGNOSIS, 3298
  - HEPATITIS, VIRUS
    - HEMOLYSIS, 3751
  - INFECTION, BACTERIA, 3710
  - LIVER
    - PERFUSION, 3697
  - LIVER DISEASE
    - PHYSICAL ACTIVITY, 3700
  - ORAL CONTRACEPTIVES, 3691
  - PSORIASIS, 3675
  - SALMONELLOSIS, 3714

- LIVER INJURY
  - ALCOHOLISM
    - REVIEWS, 3789
  - ANTIBACTERIALS, 3718
  - AROMATIC HYDROCARBONS, 3725
  - ASPIRIN
    - CHILDREN, 3726
  - CARBON TETRACHLORIDE
    - SPLENECTOMY, 3769
  - ETIOLOGY
    - ANTIINFLAMMATORY AGENTS, 3707*
  - LAXATIVES, 3719
  - THROMBOSIS
    - PEPTIDES, 3720

- LYMPH
  - GASTRIN
    - ACID SECRETION, 3077*

- LYMPHANGIECTASIA
  - INTESTINE
    - TRIGLYCERIDE, MEDIUM CHAIN, 3532

- LYMPHATICS
  - COLON
    - HYPERPLASIA, 3542*, 3581
    - NEOPLASMS, 3542*
  - ESOPHAGUS
    - MORPHOLOGY, 2981
  - MESENTERY
    - CROHNS DISEASE, 3493
    - TUBERCULOSIS, 3843
  - PANCREAS
    - ABSORPTION, 3116*
  - REGIONAL ENTERITIS
    - DISEASES ASSOCIATED WITH, 3581
  - STOMACH
    - ACID SECRETION, 3077*

- LYSOSOMES
  - ENZYMES
    - ALCOHOL, 3176
  - LIVER
    - ENZYMES, 3176
    - PHOSPHATASE, ACID, 3167

- MAGNESIUM
  - MALABSORPTION
    - SURGERY, 3462

- MALABSORPTION
  - ANEMIA, PERNICIOUS
    - DISEASES ASSOCIATED WITH, 3366
  - CARBOHYDRATE
    - METABOLISM, 3508*
  - CHILDREN, 3527
  - DISEASES ASSOCIATED WITH
    - MUSCULOSKELETAL SYSTEM, 3522
    - NERVOUS SYSTEM, 3530
  - DUODENUM
    - TUBERCULOSIS, 3470
  - ETIOLOGY
    - POLYPS, 3867
  - FOLIC ACID
    - ETIOLOGY, 3516
    - ORAL CONTRACEPTIVES, 3516
  - GASTRECTOMY
    - PEPTIC ULCER, 3391
  - GLUCOSE
    - REVIEWS, 3442
  - JEJUNUM
    - DIVERTICULUM, 3531
  - LIPIDS
    - CELIAC DISEASE, 3504*
  - LIVER
    - ENZYMES, 3695
  - MAGNESIUM
    - SURGERY, 3462
  - MINERALS
    - ENTERECTOMY, 3511
  - NEONATE, 3527
  - REVIEWS, 3534
  - SMALL INTESTINE
    - DISACCHARIDASE, 3261
    - SURGERY, 2982, 3441, 3442, 3462
  - SURGERY
    - REVIEWS, 3441, 3442
  - TRACE ELEMENT
    - ENTERECTOMY, 3511
  - ULCERATIVE COLITIS
    - DISEASES ASSOCIATED WITH, 3605*
  - VITAMIN B12
    - ANTIBACTERIALS, 3503*

-
  -
    - DEFICIENCY, 3519
  - VITAMIN E
    - GASTROINTESTINAL DISEASE, 3509*
    - LIVER DISEASE, 3509*

MALIGNANT
- SEE NEOPLASMS, MALIGNANT

MALNUTRITION
- LIPIDS
  - ABSORPTION, 3517
- PROTEIN
  - SIDEROSIS, 3699
- SUGAR
  - ABSORPTION, 3517
- VITAMIN B12
  - ABSORPTION, 3517

MANOMETRY
- SEE PRESSURE STUDIES

MARKER STUDIES
- HEPATITIS, VIRAL, 3309

MECKELS DIVERTICULUM
- NEOPLASMS, MALIGNANT, 3449
- RADIOISOTOPES, 3251
- RADIOLOGY, 3437

MECONIUM
- ILEUS
  - COMPLICATIONS, 3624
  - SURVIVAL, 3624
  - THERAPY, 3024

MEGACOLON
- REVIEWS, 3570

MEMBRANE
- LIVER
  - ION TRANSPORT, 3029

MESENTERY
- LYMPHATICS
  - CROHNS DISEASE, 3493
  - TUBERCULOSIS, 3843
- METASTASIS
  - CIRCULATION, 3477
- SMALL INTESTINE
  - ANOMALY, 3894

METABOLISM
- ALCOHOL
  - ALCOHOLISM, 3786
  - DRUG EFFECTS ON, 3147
  - LIVER, 3150, 3177
- ALDEHYDES
  - LIVER, 3160
  - MITOCHONDRIA, 3160
- AMINO ACIDS
  - ACIDOSIS, 3671*
  - ALCOHOL, 3146
  - LIVER, 3134*, 3671*
  - STOMACH, 3101
- BILE ACIDS
  - BACTERIA, 3818
- CALCIUM
  - EMBRYOLOGY, 3200*
  - GASTRECTOMY, 3391
  - HORMONE, 3222
  - PENTAGASTRIN, 3222
  - SMALL INTESTINE, 3200*
  - VITAMIN D, 3200*
- CARBOHYDRATE
  - DRUG EFFECTS ON, 3147
  - MALABSORPTION, 3508*
  - STOMACH, 3101
- CHOLINE
  - LIVER, 3177
- FATTY ACIDS
  - ALCOHOL, 3141, 3175
  - LIVER, 3141
  - STEATORRHEA, 3501*
- FOLIC ACID
  - SMALL INTESTINE, 3195*
  - SPRUE, TROPICAL, 3515
- GLUCOSE
  - BACTERIA, 3003*
  - GASTRECTOMY, 3383*
  - PANCREATITIS, CHRONIC, 3670
  - PYLOROPLASTY, 3383*
  - SMALL INTESTINE, 3003*
- HORMONE
  - PORPHYRIA, 3692
- INTESTINE
  - BACTERIA, 3231
  - STEROL, 3204
- LIPIDS
  - ALCOHOL, 3198*
  - DRUG EFFECTS ON, 3158
  - VITAMIN K, 3166
- LIPOPROTEINS
  - ALCOHOL, 3198*
- LIVER
  - ALCOHOL, 3165
  - FEEDING, 3165
  - KINETICS, 3165
- NITROSAMINES
  - BACTERIA, 3228
- PEPSIN
  - DIETARY FACTORS, 3099
- PHOSPHOLIPID
  - SEDATIVES, 3148
- POLYCYCLIC HYDROCARBONS
  - LIVER, 3143
- SEROTONIN
  - CARCINOIDS, 3284
- SMALL INTESTINE
  - ALCOHOL, 3198*
  - HORMONE, 3192*
- STEROL
  - LIVER, 3142
- SUGAR
  - DIETARY FACTORS, 3191*, 3193*
  - SMALL INTESTINE, 3191*, 3193*
- THYROID
  - HORMONE, 3183

METASTASES
- COLON
  - NEOPLASMS, MALIGNANT, 3542*

MICROORGANISMS
- SMALL INTESTINE
  - BILE ACIDS, 3483*
  - ENTERECTOMY, 3512
  - IMMUNOGLOBULINS, 3432*

- MICROSOMES
  - LIVER
    - DETOXIFICATION, 3169
    - ENZYMES, 3156
    - ION TRANSPORT, 3139
    - TOXICITY, 3169
    - VITAMIN K, 3166

- MINERALS
  - BONE
    - ALCOHOLISM, 3781
    - GASTRECTOMY, 3781
  - MALABSORPTION
    - ENTERECTOMY, 3511

- MITOCHONDRIA
  - ALDEHYDES
    - METABOLISM, 3160
  - PROTEIN
    - SYNTHESIS, 3202
  - SMALL INTESTINE
    - ENZYMES, 3209, 3210

- MITOSIS
  - DUODENUM
    - CORTICOSTEROIDS, 2994

- MONOAMINOXIDASE
  - SMALL INTESTINE
    - MORPHOLOGY, 3201

- MORTALITY
  - SEE SURVIVAL

- MOTILITY
  - ANALGESICS
    - ABSORPTION, 3030
  - CECUM
    - CALCIUM, 3053
    - DRUG EFFECTS ON, 3053
    - TEMPERATURE, 3050
  - COLON
    - HORMONE EFFECTS ON, 3054
    - NERVOUS CONTROL, 3054
    - NEUROHUMORAL FACTORS, 3058
  - DUODENUM
    - HORMONE EFFECTS ON, 3065
  - ESOPHAGUS
    - AMYLOIDOSIS, 3850
  - GALLBLADDER
    - NEUROHUMORAL AGENTS, 3062
  - GASTROINTESTINAL
    - HORMONE EFFECTS ON, 3061
    - REVIEWS, 3069
  - HIRSCHSPRUNGS DISEASE
    - NERVOUS CONTROL, 3582
    - NEUROHUMORAL AGENTS, 3582
  - ILEUM
    - ACETYLCHOLINE, 3042*
    - DRUG EFFECTS ON, 3040*, 3063
    - HORMONE EFFECTS ON, 3042*
    - NUCLEOTIDES, 3040*
    - TEMPERATURE, 3040*
  - INTESTINE
    - CALCIUM, 3047
    - CYCLIC ADENOSINE MONOPHOSPHATE, 3047
    - DRUG EFFECTS ON, 3047
    - HORMONE EFFECTS ON, 3047
  - IRRITABLE COLON
    - CHOLECYSTOKININ, 3592
  - JEJUNUM
    - DRUG EFFECTS ON, 3067
  - LARGE INTESTINE
    - CAFFEINE, 3060
    - LAXATIVES, 3043*
    - NERVOUS CONTROL, 3043*, 3064
  - PANCREATIC DUCT
    - DRUG EFFECTS ON, 3131
  - SMALL INTESTINE
    - ANOXIA, 3059
    - PARATHYROID GLAND, 3039*
    - SEROTONIN, 3059
    - SURGERY, 3044
    - ULCERATIVE COLITIS, 3605*
  - STOMACH
    - ANTIEMETICS, 3045
    - CARBOHYDRATE, 3095
    - DRUG ABSORPTION, 3030
    - ELECTROLYTE, 3095
    - GASTRECTOMY, 3405
    - HORMONE CONTROL, 3205
    - PARATHYROID GLAND, 3038*
    - TECHNIQUES, 3068
    - VITAMIN D, 3038*

- MOUTH
  - CROHNS DISEASE, 3498

- MUCOSA
  - GASTROINTESTINAL
    - DISEASES, 3486*
  - INTESTINE
    - FIBRINOLYSIS, 2988
  - MORPHOLOGY
    - CHOLERA, 3891
  - STOMACH
    - ACIDITY, 3087
    - CHOLINESTERASE, 3100
    - DUODENUM, 3435*
    - FIBRINOLYSIS, 2988
    - HETEROTOPIA, 3435*
    - SEROTONIN, 3102

- MUCUS
  - STOMACH
    - CHEMICAL COMPOSITION, 3389*

- MUSCULOSKELETAL SYSTEM
  - APPENDICITIS
    - COMPLICATIONS, 3597
  - HEPATITIS, VIRAL
    - DISEASES ASSOCIATED WITH, 3734, 3755
  - LIVER DISEASE
    - DISEASES ASSOCIATED WITH, 3693
  - MALABSORPTION
    - DISEASES ASSOCIATED WITH, 3522

- MYCOSIS
  - SEE FUNGUS DISEASE

- NAPHTHYLISOTHIOCYANATE, ALPHA
  - CHOLANGITIS, OBSTRUCTIVE, 3172
  - CHOLESTASIS
    - ANTIMETABOLITES, 3704
  - HYPERBILIRUBINEMIA
    - ANTIMETABOLITES, 3704

- LIVER
  - INJURY, 3172

- NECROSIS
  - CECUM
    - CHEMOTHERAPY, 3563
  - COLON
    - AMEBIASIS, 3903
  - INTESTINE
    - THROMBOSIS, 3564
  - LIVER
    - AROMATIC HYDROCARBONS, 3168
    - CIRCULATION, 2984
    - HALOGENATED HYDROCARBONS, 3168
    - MORPHOLOGY, 2984
    - PREVENTION, 3145
    - SHUNT, 3145
  - PANCREAS
    - ETIOLOGY, 3669
  - PANCREATITIS
    - THERAPY, 3661
  - SMALL INTESTINE
    - ENTERITIS, 3443

- NEONATE
  - SEE ALSO AGE FACTORS, CHILDREN
  - HEPATITIS
    - ANTIGEN, AUSTRALIA, 3732, 3733
    - FETOPROTEIN, ALPHA, 3733
  - HIRSCHSPRUNGS DISEASE, 3599
  - HYPERBILIRUBINEMIA
    - PHOTOTHERAPY, 3701*
  - LIVER
    - ABSCESS, 3674
  - MALABSORPTION, 3527
  - PANCREAS
    - ENZYMES, 3122*
  - PROTEIN
    - INTOLERANCE, 3521

- NEOPLASMS
  - COLON, 3575
    - LYMPHATICS, 3542*
  - DUODENUM, 3454, 3467
  - ESOPHAGUS
    - MORPHOLOGY, 3352
  - LIVER
    - SCANNING, SCINTILLATION, 3237*
  - RECTUM, 3575
  - STOMACH
    - MORPHOLOGY, 3365

- NEOPLASMS, BENIGN
  - SEE ALSO POLYPS
  - COLON, 3554
  - DUODENUM, 3376, 3466
    - LIPOMA, 3480
  - ESOPHAGUS, 3323, 3334, 3376
  - GARDNERS SYNDROME
    - DISEASES ASSOCIATED WITH, 3547
  - SMALL INTESTINE, 3461
  - STOMACH, 3376

- NEOPLASMS, MALIGNANT
  - ANEMIA, PERNICIOUS
    - DISEASES ASSOCIATED WITH, 3374
  - BILIARY TRACT
    - ATRESIA, 3820
    - OBSTRUCTION, 3831
    - SURGERY, 3831
  - BLEEDING
    - ETIOLOGY, 3839
  - COLON, 3554, 3556
    - AGE FACTORS, 3557
    - FISTULA, 3566
    - IMMUNOLOGY, 3540*
    - METASTASES, 3542*
    - PERFORATION, 3572
    - POLYPS, 3594
    - RADIOTHERAPY, 3578
    - REVIEWS, 3602
    - RISK FACTORS, 3555
    - SURGERY, 3548, 3572, 3577
    - SURVIVAL, 3559, 3561, 3580
    - ULCERATIVE COLITIS, 3576
  - DISEASES ASSOCIATED WITH, 3840
  - DUODENUM
    - GARDNERS SYNDROME, 3459
    - RADIOLOGY, 3310, 3464
  - ESOPHAGUS, 3344
    - ANGIOGRAPHY, 3264
    - DIAGNOSIS, 3348
    - FISTULA, 3341
    - SURGERY, 3326, 3328
    - ULTRASTRUCTURE, 3319
  - FAMILIAL FACTORS, 3840
  - GALLBLADDER, 3810
  - GASTRECTOMY
    - SEQUELAE, 3372
  - GASTROINTESTINAL TRACT
    - DRUG TREATMENT, 3899
  - HEPATITIS, CHRONIC
    - FAMILIAL FACTORS, 3767
  - ILEUM
    - MORPHOLOGY, 3469
  - IMMUNOLOGY
    - REVIEWS, 3837
  - JAUNDICE, OBSTRUCTIVE
    - DIAGNOSIS, 3631
  - JEJUNUM
    - MORPHOLOGY, 3469
    - PHOSPHATASE, ALKALINE, 3471
  - LARGE INTESTINE, 3549, 3840
    - BLEEDING, 3282
    - DIAGNOSIS, 3282
    - METASTASIS, 3596
    - RADIATION, 3541*
  - LIVER, 3676
    - FETOPROTEIN, ALPHA, 3257, 3265
    - HORMONE, 3678
    - RADIOLOGY, 3267
    - SCANNING, SCINTILLATION, 3239*
    - STEROID, 3672*
    - SURGERY, 3680
  - MECKELS DIVERTICULUM, 3449
  - PANCREAS
    - AGE FACTORS, 3633
    - ANGIOGRAPHY, 3236*
    - ASCITES, 3635
    - DIAGNOSIS, 3622
    - DISEASES ASSOCIATED WITH, 3625
    - RADIOLOGY, 3267
    - SURGERY, 3623, 3633, 3636, 3645
    - THERAPY, 3639
  - PERITONEUM
    - COMPLICATIONS, 3444
  - PHOSPHATASE, ALKALINE
    - ISOENZYMES, 3471

  - RECTUM
    - AMINO ACIDS, 3590
    - ENDOSCOPY, 3552
    - EPIDEMIOLOGY, 3553
    - RADIOTHERAPY, 3551, 3578
    - RISK FACTORS, 3555
    - SEQUELAE, 3583
    - SURGERY, 3548, 3568, 3577
    - SURVIVAL, 3559, 3580
  - RETROPERITONEAL
    - RECURRENCE, 3900
  - SALIVARY GLANDS, 3848
  - SMALL INTESTINE
    - CELIAC DISEASE, 3533
  - STOMACH, 3369, 3371
    - CHEMOTHERAPY, 3359
    - CYTOLOGY, EXFOLIATIVE, 3241*
    - GASTRIN, 3357*
  - ULCERATIVE COLITIS
    - DISEASES ASSOCIATED WITH, 3607*

- NERVOUS CONTROL
  - COLON
    - MOTILITY, 3054
  - HIRSCHSPRUNGS DISEASE
    - MOTILITY, 3582
  - LARGE INTESTINE
    - MOTILITY, 3043*, 3064
  - STOMACH
    - ACID SECRETION, 3114

- NERVOUS SYSTEM
  - ALCOHOL
    - TOLERANCE, 3155
  - CIRRHOSIS, BILIARY
    - DISEASES ASSOCIATED WITH, 3804
  - ESOPHAGUS
    - MORPHOLOGY, 3055
  - GASTROINTESTINAL
    - DISEASE, 3887
  - GASTROINTESTINAL TRACT
    - BLEEDING, 3888
  - ILEUM
    - DRUG EFFECTS ON, 3052
  - MALABSORPTION
    - DISEASES ASSOCIATED WITH, 3530
  - PARASITES AND PARASITIC DISEASES
    - INTESTINE, 3922
  - SALIVARY GLANDS
    - ULTRASTRUCTURE, 2993
  - SMALL INTESTINE
    - CIRCULATION, 3189*
    - ULTRASTRUCTURE, 2995

- NEUROHUMORAL AGENTS
  - COLON
    - CIRCULATION, 3058
    - MOTILITY, 3058
  - GALLBLADDER
    - MOTILITY, 3062
  - HIRSCHSPRUNGS DISEASE
    - MOTILITY, 3582
  - ILEUM
    - ION TRANSPORT, 3066

- NICOTINE
  - GASTROINTESTINAL
    - SECRETION, 3084

- NIEMANN-PICK DISEASE
  - LIVER
    - ULTRASTRUCTURE, 3696

- NITROSAMINES
  - LIVER
    - INJURY, 2970
  - METABOLISM
    - BACTERIA, 3228
  - SMALL INTESTINE
    - BACTERIA, 3228

- NUCLEIC ACIDS
  - SYNTHESIS
    - HEPATECTOMY, 3136*, 3138
    - IMMUNOSUPPRESSION, 3136*

- NUCLEOTIDASE
  - BILIARY TRACT
    - OBSTRUCTION, 3178

- NUCLEOTIDES
  - ILEUM
    - MOTILITY, 3040*
  - STOMACH
    - ACID SECRETION, 3110

- OBESITY
  - PEPTIC ULCER
    - SURGERY, 3417
  - SURGERY
    - TECHNIQUES, 3456

- OBSTRUCTION
  - BILIARY TRACT
    - IMMUNOLOGY, 3246*
    - NEOPLASMS, MALIGNANT, 3831
    - NUCLEOTIDASE, 3178
    - PHOSPHATASE, ALKALINE, 3178
    - RADIOISOTOPES, 3246*
  - INTESTINE
    - ENZYMES, 3215*
  - LARGE INTESTINE
    - TUBERCULOSIS, 3550
  - SMALL INTESTINE
    - COMPRESSION, 3444

- OBSTRUCTIVE JAUNDICE
  - SEE JAUNDICE, OBSTRUCTIVE

- OCCUPATIONAL FACTORS
  - PEPTIC ULCER
    - EPIDEMIOLOGY, 3426

- ORAL CONTRACEPTIVES
  - DUBIN-JOHNSON SYNDROME, 3706
  - FOLIC ACID
    - MALABSORPTION, 3516
  - LIVER FUNCTION TESTS, 3691

- OXYGEN
  - THERAPY
    - PERITONITIS, 3862

- PAIN

- DIAGNOSIS
  - CHILDREN, 3858
- DRUG TREATMENT
  - CHILDREN, 3885

PANCREAS
- ABSORPTION
  - CIRCULATION, 3116*
  - LYMPHATICS, 3116*
- AMYLASE
  - DIARRHEA, 3626
- ANOMALY, CONGENITAL, 3630
- CIRCULATION
  - PROSTAGLANDIN, 3218*
- ENDOSCOPY, 3314
- ENZYMES
  - ALCOHOL, 3127
  - DEFICIENCY, 3522
  - DIETARY FACTORS, 3122*
  - EMBRYOLOGY, 3129
  - FOLIC ACID, 3130
  - NEONATE, 3122*
- NECROSIS
  - ETIOLOGY, 3669
- NEOPLASMS, MALIGNANT
  - AGE FACTORS, 3633
  - ANGIOGRAPHY, 3236*
  - ASCITES, 3635
  - DIAGNOSIS, 3622
  - DISEASES ASSOCIATED WITH, 3625
  - RADIOLOGY, 3267
  - SURGERY, 3623, 3633, 3636, 3645
  - THERAPY, 3639
- PSEUDOCYST, 3640
  - RUPTURE, 3643
- RADIOLOGY
  - PANCREATITIS, 3651*
  - REVIEWS, 3304
- SECRETION
  - ALCOHOL, 3185
  - CARBONIC ANHYDRASE INHIBITORS, 3119*
  - CHOLECYSTOKININ, 3128
  - DRUG EFFECTS ON, 3117*, 3131
  - FEEDING, 3117*, 3120*, 3250*
  - HORMONE EFFECTS ON, 3111
  - INSULIN, 3120*
  - ION TRANSPORT, 3118*
  - KINETICS, 3117*
  - PANCREAS DISEASE, 3621*
  - PANCREOZYMIN, 3250*
  - PEPTIC ULCER, 3621*
  - SECRETIN, 3121*, 3123, 3125
  - SECRETION, 3250*
  - ZOLLINGER-ELLISON SYNDROME, 3621*
- TRANSPLANTATION, 3227
  - TECHNIQUES, 3220
- TRAUMA
  - AMYLASE, 3638
  - CHILDREN, 3627
  - COMPLICATIONS, 3641
  - DRUG TREATMENT, 3638
- ULTRASTRUCTURE
  - POLYCYCLIC HYDROCARBONS, 2978
  - SECRETIN, 3123
  - SPECIES DIFFERENCES, 2996

PANCREAS DISEASE
- ANGIOGRAPHY, 3243*
- BLOOD
  - AMYLASE, 3620*
- DISEASES ASSOCIATED WITH
  - SPLENOMEGALY, 3821
- ETIOLOGY, 3634
- IMMUNOLOGY
  - REVIEWS, 3629
- PANCREAS
  - SECRETION, 3621*
- SURGERY
  - REVIEWS, 3644
- THERAPY, 3121*, 3634
- URINE
  - AMYLASE, 3620*

PANCREAS FUNCTION TESTS
- BLOOD
  - AMYLASE, 3253
- GASTRECTOMY, 3642

PANCREATECTOMY
- STOMACH
  - ACID SECRETION, 3124

PANCREATIC DUCT
- BLEEDING
  - PANCREATITIS, 3658
- MOTILITY
  - DRUG EFFECTS ON, 3131
- SURGERY
  - PANCREATITIS, CHRONIC, 3650*

PANCREATITIS
- ANGIOGRAPHY
  - TECHNIQUES, 3236*
- BLOOD
  - PROTEIN, 3649*
- COMPLICATIONS
  - DIET, 3647*
  - RESPIRATORY SYSTEM, 3654
- DRUG TREATMENT
  - ANTIMETABOLITES, 3646*
- EPIDEMIOLOGY, 3665
- ETIOLOGY, 3652, 3665
  - HORMONE, 3653
  - THROMBOSIS, 3660
- INFECTION, VIRUS, 3664
- NECROSIS
  - THERAPY, 3661
- PANCREAS
  - RADIOLOGY, 3651*
- PANCREATIC DUCT
  - BLEEDING, 3658
- POSTPARTUM, 3648*
- PREGNANCY, 3648*
- PROGNOSIS, 3652
- REGIONAL ENTERITIS
  - IMMUNOSUPPRESSION, 3666
- SIMULATION
  - MORPHOLOGY, 3657
- SURGERY, 3655
- TRAUMA
  - PHYSICAL FACTORS, 3849

PANCREATITIS, CHRONIC, 3667
- ASCITES, 3663
- CALCIFICATION, 3668
  - FAMILIAL FACTORS, 3662

- COMPLICATIONS, 3656
- GLUCOSE
  - METABOLISM, 3670
- SURGERY
  - PANCREATIC DUCT, 3650*
  - SEQUELAE, 3659

PANCREOZYMIN
- BILE
  - SECRETION, 3809
- PANCREAS
  - SECRETION, 3250*

PARASITES AND PARASITIC DISEASES
- EPIDEMIOLOGY
  - CHILDREN, 3905, 3918
- INTESTINE
  - NERVOUS SYSTEM, 3922

PARATHYROID GLAND
- BLOOD
  - CALCIUM, 3207
- SMALL INTESTINE
  - MOTILITY, 3039*
- STOMACH
  - MOTILITY, 3038*

PARATYPHOID FEVER
- SEE SALMONELLOSIS

PARIETAL CELL
- ZOLLINGER-ELLISON SYNDROME
  - STOMACH, 3835*

PELLAGRA
- SMALL INTESTINE
  - BIOPSY, 3514

PENTAGASTRIN
- BILE
  - SECRETION, 3162
- CALCIUM
  - METABOLISM, 3222
- STOMACH
  - ACID SECRETION, 3073*, 3109
  - ENZYMES, 3109
  - TISSUE CULTURE, 2965*

PEPSIN
- METABOLISM
  - DIETARY FACTORS, 3099
- PEPTIC ULCER
  - STRESS, 3401
- STOMACH
  - 2-DEOXY-D-GLUCOSE, 3071*
  - HYPERCHLORHYDRIA, 3360
  - SECRETION, 3088
- ZOLLINGER-ELLISON SYNDROME
  - STOMACH, 3835*

PEPSIN SECRETION
- STOMACH
  - HYPOXIA, 3081

  - TRANSPLANTATION, 3107

PEPSINOGEN
- PEPTIC ULCER
  - ACID SECRETION, 3392

PEPTIC ULCER
- SEE ALSO STOMACH ULCER, DUODENUM ULCER
- ABSCESS
  - RETROPERITONEAL, 3395
- ACID SECRETION
  - HORMONE EFFECTS ON, 3379*
  - PEPSINOGEN, 3392
- BLEEDING
  - AGE FACTORS, 3411
  - ETIOLOGY, 3839
  - TEMPERATURE, 3407
  - TRAUMA, 3380*
- CHILDREN, 3406
- CIRRHOSIS
  - DISEASES ASSOCIATED WITH, 3391
- DISEASES ASSOCIATED WITH
  - ATHEROSCLEROSIS, 3399
- DRUG TREATMENT, 3400
- ENDOTOXIN, 3381*
- EPIDEMIOLOGY, 3427
  - ETHNIC FACTORS, 3428
  - OCCUPATIONAL FACTORS, 3426
  - SOCIOECONOMIC FACTORS, 3428
- ETIOLOGY
  - STRESS, 2964*
- GASTRECTOMY
  - MALABSORPTION, 3391
- MORPHOLOGY
  - ACID SECRETION, 3392
  - GASTRITIS, 3392
- PANCREAS
  - SECRETION, 3621*
- PERFORATION, 3412
  - ANOMALY, CONGENITAL, 3448
- STOMACH
  - ACID SECRETION, 3386*
  - CIRCULATION, 3381*
  - REFLUX, 3387*
- STRESS, 3425
  - PEPSIN, 3401
  - PREVENTION, 3396
  - VITAMIN A, 3416
- SURGERY
  - GASTRECTOMY, 3429
  - GLUCOSE, 3424
  - OBESITY, 3417
  - VAGOTOMY, 3429
- SURVIVAL
  - EPIDEMIOLOGY, 3419
- THERAPY, 3422, 3423

PEPTIDASE
- DEFICIENCY
  - CELIAC DISEASE, 3500*

PEPTIDES
- ABSORPTION
  - SMALL INTESTINE, 3011*
- LIVER INJURY
  - THROMBOSIS, 3720
- SMALL INTESTINE
  - CIRCULATION, 3206
- SODIUM

    - ABSORPTION, 3005*
  - WATER
    - ABSORPTION, 3005*

- PERFORATION
  - CECUM
    - CHEMOTHERAPY, 3563
    - ILEUS, 3544
  - COLON
    - NEOPLASMS, MALIGNANT, 3572
  - DUODENUM
    - ULCER, 3395
  - ESOPHAGUS
    - TRAUMA, 3329
  - GASTROINTESTINAL
    - ILEUS, 3394
  - GASTROINTESTINAL TRACT
    - CHILDREN, 3870
  - ILEUM
    - ANOMALY, CONGENITAL, 3448
    - SALMONELLOSIS, 3457
  - LARGE INTESTINE
    - CONTRAST MEDIA, 3598
    - ENDOSCOPY, 3277
    - PERITONITIS, 3598
  - PEPTIC ULCER, 3412
    - ANOMALY, CONGENITAL, 3448
  - PERITONEUM, 3844

- PERFUSION
  - HEPATITIS, VIRAL
    - TRANSMISSION, 3749
  - LIVER, 3684
    - ACIDITY, 3134*
    - ENZYMES, 3134*
    - GLYCOGEN, 2971
    - LIVER FUNCTION TESTS, 3697
  - SMALL INTESTINE
    - CIRCULATION, 3189*
  - STOMACH
    - MORPHOLOGY, 3359

- PERISTALSIS
  - ILEUM
    - PROSTAGLANDIN, 3046

- PERITONEOSCOPY, 3272, 3273

- PERITONEUM
  - ADHESIONS
    - PREVENTION, 3874
    - SIMULATION, 3874
  - NEOPLASMS, MALIGNANT
    - COMPLICATIONS, 3444
  - PERFORATION, 3844

- PERITONITIS
  - BACTERIA
    - REVIEWS, 3869
  - CHILDREN, 3883
  - DIAGNOSIS
    - CHILDREN, 3884
  - DRUG TREATMENT
    - ANTIBIOTICS, 3890
  - ETIOLOGY, 3876
  - FOREIGN BODIES, 3836*, 3842
    - THERAPY, 3846, 3882
  - LARGE INTESTINE
    - PERFORATION, 3598

  - OXYGEN
    - THERAPY, 3862

- PHENOBARBITAL
  - BILIARY TRACT
    - MORPHOLOGY, 3171

- PHOSPHATASE, ACID
  - LIVER
    - LYSOSOMES, 3167

- PHOSPHATASE, ALKALINE
  - BILIARY TRACT
    - OBSTRUCTION, 3178
  - ISOENZYMES
    - NEOPLASMS, MALIGNANT, 3471
  - JEJUNUM
    - NEOPLASMS, MALIGNANT, 3471
  - REVIEWS, 3287

- PHOSPHOLIPID
  - LIVER DISEASE
    - THERAPY, 3698
  - METABOLISM
    - SEDATIVES, 3148

- PHOTOTHERAPY
  - HYPERBILIRUBINEMIA
    - NEONATE, 3701*

- PHYSICAL ACTIVITY
  - LIVER DISEASE
    - LIVER FUNCTION TESTS, 3700

- PHYSICAL FACTORS
  - LIVER
    - INJURY, 3849
  - PANCREATITIS
    - TRAUMA, 3849
  - STOMACH
    - SECRETION, 3091

- PITUITARY GLAND
  - CIRRHOSIS
    - DISEASES ASSOCIATED WITH, 3800
  - HEMOCHROMATOSIS
    - DISEASES ASSOCIATED WITH, 3800
  - HORMONE
    - CHEMICAL COMPOSITION, 3061
    - ISOLATION, 3061

- PLASMA
  - SEE BLOOD

- PLATELETS
  - BLEEDING
    - ETIOLOGY, 3847

- POLYCYCLIC HYDROCARBONS
  - BILE
    - SECRETION, 3143, 3144
  - LIVER
    - ULTRASTRUCTURE, 3144
  - METABOLISM
    - LIVER, 3143
  - PANCREAS
    - ULTRASTRUCTURE, 2978

- POLYPS

    SEE ALSO NEOPLASMS, BENIGN
    ANEMIA, PERNICIOUS
        DISEASES ASSOCIATED WITH, 3374
    COLON
        NEOPLASMS, MALIGNANT, 3594
        SURGERY, 3573, 3574, 3595
    MALABSORPTION
        ETIOLOGY, 3867

PORPHYRIA
    HORMONE
        METABOLISM, 3692
    LIVER
        ENZYMES, 3791
        MORPHOLOGY, 3690
        STEROID, 3692

PORTAL HYPERTENSION
    CHILDREN, 3679
    CIRCULATION
        CIRRHOSIS, 3785
        HEPATITIS, NONVIRAL, 3785
        LIVER DISEASE, ALCOHOLIC, 3785
    DISEASES ASSOCIATED WITH
        HEMORRHOIDS, 3603
        SPLENOMEGALY, 3821
    LIVER
        SARCOIDOSIS, 3677
    SURGERY, 3796
        CIRCULATION, 3276

POSTPARTUM
    PANCREATITIS, 3648*

POSTURAL FACTORS
    DUMPING SYNDROME, 3317

POTASSIUM
    ILEUM
        ION TRANSPORT, 3066

PRECANCER
    ULCERATIVE COLITIS
        DISEASES ASSOCIATED WITH, 3607*

PREGNANCY
    FATTY LIVER, 3780
    PANCREATITIS, 3648*

PRESSURE STUDIES
    ESOPHAGUS
        REFLUX, 3312
    HIRSCHSPRUNGS DISEASE, 3279
    INCONTINENCE, 3279
    PYLORUS, 3041*
    SMALL INTESTINE, 3056
    STOMACH
        ULCER, 3387*

PREVENTION
    ADHESIONS
        PERITONEUM, 3874
    CHOLERA
        IMMUNOLOGY, 3897
    LIVER
        NECROSIS, 3145
    PEPTIC ULCER
        STRESS, 3396
    ULCERATIVE COLITIS
        ANTIBACTERIALS, 3614

PRIMATES
    GASTROINTESTINAL
        DISEASE, 3219

PROGNOSIS
    CIRRHOSIS, 3803
    HEPATITIS, SERUM
        ANTIGEN, AUSTRALIA, 3731
    HEPATITIS, VIRAL
        HEPATITIS, CHRONIC, 3736
    PANCREATITIS, 3652

PROLAPSE
    RECTUM
        THERAPY, 3600

PROSTAGLANDIN
    ILEUM
        PERISTALSIS, 3046
    PANCREAS
        CIRCULATION, 3218*
    STOMACH
        ACID SECRETION, 3078*

PROTEIN
    BLOOD
        BILIARY DISEASE, 3778
        LIVER DISEASE, 3778
        PANCREATITIS, 3649*
    DEFICIENCY
        FATTY LIVER, 3782
    DUODENUM
        CALCIUM, 3208
    INTOLERANCE
        ENZYMES, 3695
        NEONATE, 3521
    LIVER
        RIBOSOMES, 2975
    MALNUTRITION
        SIDEROSIS, 3699
    STOMACH
        AGE FACTORS, 3096
    SYNTHESIS
        INHIBITION, 3015
        MITOCHONDRIA, 3202
        SMALL INTESTINE, 3202

PROTEIN-LOSING ENTEROPATHY
    GASTROENTERITIS
        DISEASES ASSOCIATED WITH, 3520
    SMALL INTESTINE
        SURGERY, 3441
    TRIGLYCERIDE, MEDIUM CHAIN, 3532

PSEUDOCYST
    PANCREAS, 3640
        RUPTURE, 3643

PSEUDOTUMOR
    STOMACH
        ETIOLOGY, 3370

PSORIASIS
    LIVER
        BIOPSY, 3675
    LIVER FUNCTION TESTS, 3675

- PSYCHOLOGICAL FACTORS
  - KWASHIORKOR, 3536

- PYLOROPLASTY
  - GLUCOSE
    - METABOLISM, 3383*
  - STOMACH
    - ACID SECRETION, 3388*

- PYLORUS
  - SEE ALSO STOMACH
  - ELECTROPHYSIOLOGY, 3041*
  - PRESSURE STUDIES, 3041*

- RADIATION
  - ENTERITIS
    - SEQUELAE, 3682
  - HEPATITIS, 3717
  - LARGE INTESTINE
    - NEOPLASMS, MALIGNANT, 3541*
  - SMALL INTESTINE
    - INJURY, 2986

- RADIOIMMUNOASSAY
  - GASTROINTESTINAL
    - DIAGNOSIS, 3290

- RADIOISOTOPES
  - BILIARY TRACT
    - OBSTRUCTION, 3246*
  - HEPATITIS, VIRAL
    - CLOTTING, 3730*
  - JAUNDICE
    - DIAGNOSIS, 3702
  - LIVER
    - CIRCULATION, 3799
    - FIBROSIS, 3799
    - HYPERPLASIA, 3795
  - LIVER DISEASE
    - DIAGNOSIS, 3300
  - MECKELS DIVERTICULUM, 3251
  - STOMACH
    - CIRCULATION, 3242*
    - SECRETION, 3242*

- RADIOLOGY
  - ACUTE
    - ABDOMEN, 3873
  - BILIARY TRACT
    - CHOLEDOCHOLITHIASIS, 3814
  - DUODENUM
    - NEOPLASMS, MALIGNANT, 3310, 3464
    - ULCER, 3271
  - GALLBLADDER
    - GLUCAGON, 3291
    - TECHNIQUES, 3274
  - GASTROINTESTINAL
    - COMPLICATIONS, 3893
  - JAUNDICE, OBSTRUCTIVE
    - TECHNIQUES, 3270
  - LARGE INTESTINE
    - MORPHOLOGY, 3473
  - LIVER
    - NEOPLASMS, MALIGNANT, 3267
  - MECKELS DIVERTICULUM, 3437
  - PANCREAS
    - NEOPLASMS, MALIGNANT, 3267
    - PANCREATITIS, 3651*
    - REVIEWS, 3304
  - SMALL INTESTINE
    - MORPHOLOGY, 3473
  - STOMACH
    - TECHNIQUES, 3254
  - ULCERATIVE COLITIS
    - CONTRAST MEDIA, 3233*

- RADIOTELEMETRY
  - STOMACH
    - ACIDITY, 3105
    - DIAGNOSIS, 3306

- RADIOTHERAPY
  - COLON
    - NEOPLASMS, MALIGNANT, 3578
  - RECTUM
    - NEOPLASMS, MALIGNANT, 3551, 3578

- RECTUM
  - SEE ALSO LARGE INTESTINE
  - ABSCESS, 3558
  - BIOPSY
    - COLITIS, 3311
    - CROHNS DISEASE, 3487*
  - CYSTS
    - COLITIS, 3585
  - ENDOSCOPY
    - TECHNIQUES, 3313
  - NEOPLASMS, 3575
  - NEOPLASMS, MALIGNANT
    - AMINO ACIDS, 3590
    - ENDOSCOPY, 3552
    - EPIDEMIOLOGY, 3553
    - RADIOTHERAPY, 3551, 3578
    - RISK FACTORS, 3555
    - SEQUELAE, 3583
    - SURGERY, 3548, 3568, 3577
    - SURVIVAL, 3559, 3580
  - PROLAPSE
    - THERAPY, 3600
  - STIMULATION
    - DEFECATION, 3043*

- REFLUX
  - ESOPHAGUS
    - PRESSURE STUDIES, 3312
    - SURGERY, 3325
  - STOMACH
    - PEPTIC ULCER, 3387*

- REGENERATION
  - LIVER
    - ENZYMES, 3138
    - ULTRASTRUCTURE, 3161
  - SMALL INTESTINE
    - SURGERY, 2983

- REGIONAL ENTERITIS
  - SEE ALSO ENTERITIS
  - DISEASES ASSOCIATED WITH
    - LYMPHATICS, 3581
    - SARCOIDOSIS, 3495
  - IMMUNOLOGY, 3606*
  - IMMUNOSUPPRESSION
    - PANCREATITIS, 3666
  - SIMULATION, 3494

- REJECTION
  - INTESTINE

- TRANSPLANTATION, 3436*
- LIVER
  - TRANSPLANTATION, 3159

- RESPIRATORY SYSTEM
  - PANCREATITIS
    - COMPLICATIONS, 3654

- REVIEWS
  - AMEBIASIS
    - INTESTINE, 3906
  - CHOLESTASIS, 3827
  - CHOLESTEROL
    - SYNTHESIS, 3174
  - COLON
    - NEOPLASMS, MALIGNANT, 3602
  - CYSTIC FIBROSIS, 3632
  - ESOPHAGUS
    - CHEMICAL BURNS, 3351
    - STRICTURE, 3354
  - FATTY LIVER
    - ETIOLOGY, 3788
  - GASTROINTESTINAL
    - DISEASE, 3852
    - ENDOSCOPY, 3292
    - MOTILITY, 3069
    - SECRETION, 3084
  - HEPATITIS, CHRONIC, 3764
  - HEPATITIS, VIRAL, 3735
    - ETIOLOGY, 3752
  - HERNIA, HIATUS, 3321
  - HIRSCHSPRUNGS DISEASE, 3570
  - LIPIDS
    - ABSORPTION, 3027
  - LIVER DISEASE
    - AUTOIMMUNITY, 3765
  - LIVER INJURY
    - ALCOHOLISM, 3789
  - MALABSORPTION, 3534
    - GLUCOSE, 3442
    - SURGERY, 3441, 3442
  - MEGACOLON, 3570
  - NEOPLASMS, MALIGNANT
    - IMMUNOLOGY, 3837
  - PANCREAS
    - RADIOLOGY, 3304
  - PANCREAS DISEASE
    - IMMUNOLOGY, 3629
    - SURGERY, 3644
  - PERITONITIS
    - BACTERIA, 3869
  - PHOSPHATASE, ALKALINE, 3287
  - STOMACH
    - ACID SECRETION, 3114

- RIBOSOMES
  - LIVER
    - ANTIBIOTICS, 2974
    - CARBON TETRACHLORIDE, 2974
    - DIETARY FACTORS, 2975
    - ELECTROLYTE, 2973
    - ETHIONINE, 2974
    - PROTEIN, 2975

- RISK FACTORS
  - COLON
    - NEOPLASMS, MALIGNANT, 3555
  - RECTUM
    - NEOPLASMS, MALIGNANT, 3555

- RUPTURE
  - PANCREAS
    - PSEUDOCYST, 3643

- SALIVA
  - SODIUM
    - CYSTIC FIBROSIS, 3637
  - STOMACH
    - ACID SECRETION, 3112

- SALIVARY GLANDS
  - DISEASES, 3838
  - NEOPLASMS, MALIGNANT, 3848
  - NERVOUS SYSTEM
    - ULTRASTRUCTURE, 2993

- SALMONELLOSIS
  - EPIDEMIOLOGY, 3875
  - ILEUM
    - PERFORATION, 3457
  - LIVER
    - BIOPSY, 3714
  - LIVER FUNCTION TESTS, 3714
  - SEROLOGICAL DIAGNOSIS, 3875

- SARCOIDOSIS
  - LIVER
    - BIOPSY, 3713
    - PORTAL HYPERTENSION, 3677
  - REGIONAL ENTERITIS
    - DISEASES ASSOCIATED WITH, 3495
  - WHIPPLES DISEASE
    - DISEASES ASSOCIATED WITH, 3524

- SCANNING, SCINTILLATION
  - LIVER
    - ABSCESS, 3237*, 3239*
    - AMEBIASIS, 3244*
    - CIRCULATION, 3302
    - CYST, 3239*
    - HEMOCHROMATOSIS, 3301
    - NEOPLASMS, 3237*
    - NEOPLASMS, MALIGNANT, 3239*
    - TECHNIQUES, 3289, 3305

- SCHISTOSOMIASIS
  - DRUG EFFECTS ON
    - FATTY ACIDS, 3919
  - LIVER, 3917
    - FIBROSIS, 3919

- SCLERODERMA
  - ESOPHAGUS
    - THERAPY, 3350

- SECRETIN
  - BILE
    - SECRETION, 3809
  - PANCREAS
    - SECRETION, 3121*, 3123, 3125
    - ULTRASTRUCTURE, 3123
  - SMALL INTESTINE
    - ENZYMES, 3190*

- SECRETION

- ALCOHOLS, POLYHYDRIC
  - APPENDIX, 3007*
- AMINO ACIDS
  - INTESTINE, 3031
- BILE
  - CHOLESTASIS, 3809
  - HISTAMINE, 3162
  - PANCREOZYMIN, 3809
  - PENTAGASTRIN, 3162
  - POLYCYCLIC HYDROCARBONS, 3143, 3144
  - SECRETIN, 3809
  - VASOPRESSIN, 3137
- CHOLECYSTOKININ
  - CELIAC DISEASE, 3504*
- COLON
  - FATTY ACIDS, 3197*
- DUODENUM
  - ACIDITY, 3288
- ELECTROLYTE
  - APPENDIX, 3007*
- GASTROINTESTINAL
  - NICOTINE, 3084
  - REVIEWS, 3084
- JEJUNUM
  - CHOLERA, 3211
  - ION TRANSPORT, 3004*
- LIVER
  - LIPIDS, 3240*
  - TECHNIQUES, 3240*
- PANCREAS
  - ALCOHOL, 3185
  - CARBONIC ANHYDRASE INHIBITORS, 3119*
  - CHOLECYSTOKININ, 3128
  - DRUG EFFECTS ON, 3117*, 3131
  - FEEDING, 3117*, 3120*, 3250*
  - HORMONE EFFECTS ON, 3111
  - INSULIN, 3120*
  - ION TRANSPORT, 3118*
  - KINETICS, 3117*
  - PANCREAS DISEASE, 3621*
  - PANCREOZYMIN, 3250*
  - PEPTIC ULCER, 3621*
  - SECRETIN, 3121*, 3123, 3125
  - SECRETION, 3250*
  - ZOLLINGER-ELLISON SYNDROME, 3621*
- SMALL INTESTINE
  - ANALYSIS, 3194*
- STOMACH
  - ACID SECRETION, 3088
  - ACIDITY, 3085
  - CARBOHYDRATE, 3095
  - CORTICOSTEROIDS, 3085, 3094
  - DIETARY FACTORS, 3098
  - ELECTROLYTE, 3095, 3097
  - ELECTROPHYSIOLOGY, 3057
  - ENTEROGASTRONE, 3103
  - GLYCOPROTEINS, 2992
  - HYPEROXIA, 3079*
  - INHIBITION, 2992
  - INTRINSIC FACTOR, 3092
  - PEPSIN, 3088
  - PHYSICAL FACTORS, 3091
  - RADIOISOTOPES, 3242*
  - STRESS, 3091
  - TECHNIQUES, 3010*
  - TEMPERATURE, 3079*
  - ZOLLINGER-ELLISON SYNDROME, 3866
- WATER
  - ABSORPTION, 3004*

SEDATIVES
- LIVER
  - CHEMICAL COMPOSITION, 3149
  - ENZYMES, 3149
  - ULTRASTRUCTURE, 3148, 3149
- PHOSPHOLIPID
  - METABOLISM, 3148

SEROLOGICAL DIAGNOSIS
- SALMONELLOSIS, 3875

SEROTONIN
- METABOLISM
  - CARCINOIDS, 3284
- SMALL INTESTINE
  - MOTILITY, 3059
- STOMACH
  - MUCOSA, 3102

SERUM
- SEE BLOOD

SEX FACTORS
- CHOLINESTERASE, 3100
- HEPATITIS, VIRAL
  - EPIDEMIOLOGY, 3757

SHOCK
- ENDOTOXIN
  - ABSORPTION, 3019

SHORT BOWEL SYNDROME
- SURGERY
  - TECHNIQUES, 3535
- THERAPY, 3465

SHUNT
- LIVER
  - NECROSIS, 3145
  - TRANSPLANTATION, 3226

SIDEROSIS
- PROTEIN
  - MALNUTRITION, 3699

SIGMOID
- SEE ALSO LARGE INTESTINE

SMALL INTESTINE
- SEE ALSO DUODENUM, JEJUNUM, ILEUM
- SEE ALSO INTESTINE
- ABSORPTION
  - GLUCOSE, 3026
  - HORMONE EFFECTS ON, 3021
  - INHIBITION, 3015
- AMINO ACIDS
  - ABSORPTION, 3011*
- ANOMALY
  - MESENTERY, 3894
- ANOMALY, CONGENITAL
  - ATRESIA, 3455
  - STENOSIS, 3455
- BACTERIA
  - BILE ACIDS, 3818
- BIOPSY
  - CELIAC DISEASE, 3278

    - PELLAGRA, 3514
    - WHIPPLES DISEASE, 3524
  - CALCIUM
    - METABOLISM, 3200*
  - CELLS
    - KINETICS, 3203
  - CHEMICAL COMPOSITION
    - CROHNS DISEASE, 3489
  - CHOLESTEROL
    - ABSORPTION, 3009*
  - CIRCULATION
    - ELECTROPHYSIOLOGY, 3214*
    - PEPTIDES, 3206
  - COPPER
    - ABSORPTION, 3037
  - DISACCHARIDASE
    - GASTRECTOMY, 3539
    - MALABSORPTION, 3261
    - ULCERATIVE COLITIS, 3539
  - DRUG ABSORPTION
    - TECHNIQUES, 3034
  - ELECTROPHYSIOLOGY, 3056
    - LACTIC ACID, 3051
  - ENDOCRINE SYSTEM
    - AGE FACTORS, 2987
  - ENZYMES
    - CHOLECYSTOKININ, 3190*
    - SECRETIN, 3190*
  - FATTY ACIDS
    - ABSORPTION, 3199*
  - FOLIC ACID
    - ABSORPTION, 3195*
    - METABOLISM, 3195*
  - GLUCOSE
    - ABSORPTION, 3006*
    - METABOLISM, 3003*
  - HORMONE
    - CHEMICAL COMPOSITION, 3205
  - HYMENOLEPIASIS, 3904
  - IMMUNOGLOBULINS, 2980
  - IMMUNOLOGY
    - WHIPPLES DISEASE, 3433*
  - INJURY
    - RADIATION, 2986
  - INSULIN
    - ABSORPTION, 3028
  - LACTASE
    - GASTRECTOMY, 3538
  - METABOLISM
    - ALCOHOL, 3198*
    - HORMONE, 3192*
  - MICROORGANISMS
    - BILE ACIDS, 3483*
    - ENTERECTOMY, 3512
    - IMMUNOGLOBULINS, 3432*
  - MITOCHONDRIA
    - ENZYMES, 3209, 3210
  - MORPHOLOGY
    - AROMATIC HYDROCARBONS, 2985
    - CHILDREN, 2989, 3463
    - CHOLINESTERASE, 3201
    - MONOAMINOXIDASE, 3201
    - RADIOLOGY, 3473
    - ULCERATIVE COLITIS, 3605*
    - VITAMIN D, 3203
  - MOTILITY
    - ANOXIA, 3059
    - PARATHYROID GLAND, 3039*
    - SEROTONIN, 3059
    - ULCERATIVE COLITIS, 3605*
  - NECROSIS
    - ENTERITIS, 3443
  - NEOPLASMS, BENIGN, 3461
  - NEOPLASMS, MALIGNANT
    - CELIAC DISEASE, 3533
  - NERVOUS SYSTEM
    - CIRCULATION, 3189*
    - ULTRASTRUCTURE, 2995
  - NITROSAMINES
    - BACTERIA, 3228
  - OBSTRUCTION
    - COMPRESSION, 3444
  - PEPTIDES
    - ABSORPTION, 3011*
  - PERFUSION
    - CIRCULATION, 3189*
  - PRESSURE STUDIES, 3056
  - PROTEIN
    - SYNTHESIS, 3202
  - SECRETION
    - ANALYSIS, 3194*
  - SUGAR
    - ABSORPTION, 3191*, 3193*
    - METABOLISM, 3191*, 3193*
  - SURGERY
    - BACTERIA, 3213
    - BILE ACIDS, 3483*
    - COMPLICATIONS, 3213
    - HYPERCHLORHYDRIA, 3080
    - KINETICS, CELL, 2983
    - MALABSORPTION, 2982, 3441, 3442, 3462
    - MOTILITY, 3044
    - PROTEIN-LOSING ENTEROPATHY, 3441
    - REGENERATION, 2983
    - SEQUELAE, 3478, 3479
    - STEATORRHEA, 3441
    - TECHNIQUES, 3431*
  - ULTRASTRUCTURE
    - ENZYMES, 3210
    - HORMONE, 3192*
    - STRANGULATION, 3430*
    - WHIPPLES DISEASE, 3433*
  - VOLVULUS
    - DISEASES ASSOCIATED WITH, 3476

- SOCIOECONOMIC FACTORS
  - PEPTIC ULCER
    - EPIDEMIOLOGY, 3428

- SODIUM
  - ABSORPTION
    - AMINO ACIDS, 3005*
    - ILEUM, 3008*
    - PEPTIDES, 3005*
  - INTESTINE
    - ION TRANSPORT, 3002*
  - SALIVA
    - CYSTIC FIBROSIS, 3637
  - STOMACH
    - ION TRANSPORT, 3072*

- SONOGRAPHY
  - SEE ECHOGRAPHY

- SPECIES DIFFERENCES
  - INTESTINE
    - STEROL, 3204

  LIVER
    ENZYMES, 3223
  PANCREAS
    ULTRASTRUCTURE, 2996

SPHINCTER
  ANORECTUM
    CONSTIPATION, 3562
    INCONTINENCE, 3562

SPLENECTOMY
  HEPATITIS, CHRONIC
    LIVER FUNCTION TESTS, 3769
  LIVER INJURY
    CARBON TETRACHLORIDE, 3769

SPLENOMEGALY
  BILIARY DISEASE
    DISEASES ASSOCIATED WITH, 3821
  PANCREAS DISEASE
    DISEASES ASSOCIATED WITH, 3821
  PORTAL HYPERTENSION
    DISEASES ASSOCIATED WITH, 3821

SPRUE, TROPICAL
  FOLIC ACID
    METABOLISM, 3515

STEATORRHEA
  ETIOLOGY
    CIRRHOSIS, 3807
    FATTY ACIDS, 3501*
  FATTY ACIDS
    METABOLISM, 3501*
  FECES
    LIPIDS, 3505*
  SMALL INTESTINE
    SURGERY, 3441

STEATOSIS
  SEE FATTY LIVER

STENOSIS
  ESOPHAGUS
    SURGERY, 3324
  SMALL INTESTINE
    ANOMALY, CONGENITAL, 3455

STEROID
  LIVER
    NEOPLASMS, MALIGNANT, 3672*
    PORPHYRIA, 3692

STEROL
  INTESTINE
    CHEMICAL COMPOSITION, 3204
    METABOLISM, 3204
    SPECIES DIFFERENCES, 3204
  METABOLISM
    LIVER, 3142

STIMULATION
  RECTUM
    DEFECATION, 3043*

STOMACH
  SEE ALSO ANTRUM, PYLORUS
  ABSORPTION
    ASPIRIN, 3076*
    SUGARS, 3076*
  ACID SECRETION
    ACIDITY, 3072*
    ANTICOAGULANTS, 3083
    ANTRECTOMY, 3073*
    ASPIRIN, 3076*, 3108, 3362
    CHOLECYSTOKININ, 3074*
    CHOLINERGIC AGENTS, 3093
    CIRRHOSIS, 3115
    2-DEOXY-D-GLUCOSE, 3071*, 3073*
    DIURETICS, 3404
    DRUG EFFECTS ON, 3086, 3089
    GASTRECTOMY, 3405
    GASTRIN, 3075*
    GASTRONE, 3082
    GLUCAGON, 3106
    HORMONE EFFECTS ON, 3111
    HYPERCHLORHYDRIA, 3360
    HYPOXIA, 3081
    INHIBITION, 3070*, 3083
    INSULIN, 3385*
    LYMPHATICS, 3077*
    NERVOUS CONTROL, 3114
    NUCLEOTIDES, 3110
    PANCREATECTOMY, 3124
    PENTAGASTRIN, 3073*, 3109
    PEPTIC ULCER, 3386*
    PROSTAGLANDIN, 3078*
    PYLOROPLASTY, 3388*
    REVIEWS, 3114
    SALIVA, 3112
    SECRETION, 3088
    TECHNIQUES, 3090, 3113
    TRAUMA, 3104
    TRIGLYCERIDE, 3074*
    VAGOTOMY, 3384*, 3385*, 3388*
  ACIDITY
    CHOLERA, 3855
    DIARRHEA, 3855
    RADIOTELEMETRY, 3105
  AMINO ACIDS
    METABOLISM, 3101
  ANOMALY, 3373
  ANOMALY, CONGENITAL
    THERAPY, 3363
  BLEEDING
    ASPIRIN, 3362
  CARBOHYDRATE
    METABOLISM, 3101
  CIRCULATION
    ACID SECRETION, 3089
    ASPIRIN, 3216*
    BILE ACIDS, 3216*
    GASTRONE, 3082
    PEPTIC ULCER, 3381*
    RADIOISOTOPES, 3242*
    TECHNIQUES, 3217*
  DIAGNOSIS
    CONTRAST MEDIA, 3295
    RADIOTELEMETRY, 3306
  DIVERTICULUM, 3361
  DRUG ABSORPTION
    GASTRONE, 3082
  DRUG EFFECTS ON
    HYPOXIA, 3081
  DUODENUM
    ELECTROPHYSIOLOGY, 3049
  ELECTROPHYSIOLOGY
    ASPIRIN, 3076*

  - DUODENUM, 3049
  - SECRETION, 3057
  - SUGARS, 3076*
- ENDOCRINE SYSTEM
  - ANEMIA, PERNICIOUS, 3358*
- ENDOSCOPY
  - ANEMIA, PERNICIOUS, 3374
  - TRANQUILIZERS, 3296
  - VAGOTOMY, 3414
- ENZYMES
  - PENTAGASTRIN, 3109
- FOREIGN BODIES
  - DRUG TREATMENT, 3367
- ION TRANSPORT
  - BILE ACIDS, 3382*
  - ELECTROPHYSIOLOGY, 3036
  - SODIUM, 3072*
- KINETICS, CELL, 2977
  - GASTRIN, 2969
- MORPHOLOGY
  - CIRCULATION, 2964*
  - ENDOCRINE SYSTEM, 2968
  - ENZYMES, 3101
  - GASTRIN, 2968
  - HORMONE EFFECTS ON, 2964*
  - STRESS, 2964*
- MOTILITY
  - ANTIEMETICS, 3045
  - CARBOHYDRATE, 3095
  - DRUG ABSORPTION, 3030
  - ELECTROLYTE, 3095
  - GASTRECTOMY, 3405
  - HORMONE CONTROL, 3205
  - PARATHYROID GLAND, 3038*
  - TECHNIQUES, 3068
  - VITAMIN D, 3038*
- MUCOSA
  - ACIDITY, 3087
  - CHOLINESTERASE, 3100
  - DUODENUM, 3435*
  - FIBRINOLYSIS, 2988
  - HETEROTOPIA, 3435*
  - SEROTONIN, 3102
- MUCUS
  - CHEMICAL COMPOSITION, 3389*
- NEOPLASMS
  - MORPHOLOGY, 3365
- NEOPLASMS, BENIGN, 3376
- NEOPLASMS, MALIGNANT, 3369, 3371
  - CHEMOTHERAPY, 3359
  - CYTOLOGY, EXFOLIATIVE, 3241*
  - GASTRIN, 3357*
- PEPSIN
  - 2-DEOXY-D-GLUCOSE, 3071*
  - HYPERCHLORHYDRIA, 3360
  - SECRETION, 3088
- PEPSIN SECRETION
  - HYPOXIA, 3081
- PERFUSION
  - MORPHOLOGY, 3359
- PROTEIN
  - AGE FACTORS, 3096
- PSEUDOTUMOR
  - ETIOLOGY, 3370
- RADIOLOGY
  - TECHNIQUES, 3254
- REFLUX
  - PEPTIC ULCER, 3387*
- SECRETION
  - ACIDITY, 3085
  - CARBOHYDRATE, 3095
  - CORTICOSTEROIDS, 3085, 3094
  - DIETARY FACTORS, 3098
  - ELECTROLYTE, 3095, 3097
  - ENTEROGASTRONE, 3103
  - GLYCOPROTEINS, 2992
  - HYPEROXIA, 3079*
  - INHIBITION, 2992
  - INTRINSIC FACTOR, 3092
  - PHYSICAL FACTORS, 3091
  - RADIOISOTOPES, 3242*
  - STRESS, 3091
  - TECHNIQUES, 3010*
  - TEMPERATURE, 3079*
  - ZOLLINGER-ELLISON SYNDROME, 3866
- TISSUE CULTURE
  - PENTAGASTRIN, 2965*
- TRANSPLANTATION
  - ACID SECRETION, 3107
  - PEPSIN SECRETION, 3107
- ULCER
  - ASPIRIN, 3362
  - CYTOLOGY, EXFOLIATIVE, 3241*
  - DRUG THERAPY, 3389*
  - DRUG TREATMENT, 3420
  - PRESSURE STUDIES, 3387*
- ULTRASTRUCTURE
  - ANEMIA, PERNICIOUS, 3358*
  - TISSUE CULTURE, 2965*
- ZOLLINGER-ELLISON SYNDROME
  - PARIETAL CELL, 3835*
  - PEPSIN, 3835*

STOMACH ULCER
- SEE ALSO PEPTIC ULCER

STRANGULATION
- SMALL INTESTINE
  - ULTRASTRUCTURE, 3430*

STRESS
- BLEEDING
  - ETIOLOGY, 3854
- PEPTIC ULCER, 3425
  - ETIOLOGY, 2964*
  - PEPSIN, 3401
  - PREVENTION, 3396
  - VITAMIN A, 3416
- STOMACH
  - MORPHOLOGY, 2964*
  - SECRETION, 3091

STRICTURE
- BILIARY TRACT
  - SURGERY, 3822
- ESOPHAGITIS, REFLUX
  - SURGERY, 3349
- ESOPHAGUS, 3338
  - DILATATION, 3330, 3340
  - REVIEWS, 3354
  - THERAPY, 3327, 3353, 3354
- JEJUNUM
  - ULCER, 3481

SUCRASE
- DEFICIENCY
  - CARBOHYDRATE, 3508*

- SUGAR
  - ABSORPTION
    - DIETARY FACTORS, 3191*, 3193*
    - MALNUTRITION, 3517
    - SMALL INTESTINE, 3191*, 3193*
    - TECHNIQUES, 3247*, 3248*
  - CALCIUM
    - ION TRANSPORT, 3020
  - CIRRHOSIS
    - DRUG TREATMENT, 3793*
  - METABOLISM
    - DIETARY FACTORS, 3191*, 3193*
    - SMALL INTESTINE, 3191*, 3193*
  - STOMACH
    - ABSORPTION, 3076*
    - ELECTROPHYSIOLOGY, 3076*

- SULFOBROMOPHTHALEIN
  - HEPATITIS, CHRONIC, 3249*
  - KINETICS
    - BILIARY DISEASE, 3263
    - LIVER DISEASE, 3263
  - LIVER DISEASE
    - DIAGNOSIS, 3300

- SURGERY
  - BILE DUCT
    - TRAUMA, 3815
  - BILIARY TRACT
    - ATRESIA, 3826
    - COMPLICATIONS, 3817
    - NEOPLASMS, MALIGNANT, 3831
    - STRICTURE, 3822
    - TECHNIQUES, 3832
  - CHOLEDOCHOLITHIASIS, 3816
  - CHOLELITHIASIS
    - COMPLICATIONS, 3833
  - CIRRHOSIS
    - HYPERTENSION, 3798
  - COLON
    - CROHNS DISEASE, 3611
    - DIVERTICULUM, 3601
    - NEOPLASMS, MALIGNANT, 3548, 3572, 3577
    - POLYPS, 3573, 3574, 3595
  - CROHNS DISEASE, 3612
  - DIVERTICULITIS
    - LARGE INTESTINE, 3589
  - DUODENUM
    - ULCER, 3417, 3424, 3450
  - ECHINOCOCCOSIS
    - LIVER, 3920
  - ESOPHAGITIS, REFLUX
    - STRICTURE, 3349
  - ESOPHAGUS
    - NEOPLASMS, MALIGNANT, 3326, 3328
    - REFLUX, 3325
    - STENOSIS, 3324
  - HERNIA
    - TECHNIQUES, 3460
  - HERNIA, HIATUS
    - CHILDREN, 3339
  - HIRSCHSPRUNGS DISEASE, 3565
  - ILEUM
    - DIARRHEA, 3497
  - JEJUNUM
    - DUMPING SYNDROME, 3410
  - LIVER
    - NEOPLASMS, MALIGNANT, 3680
  - MAGNESIUM
    - MALABSORPTION, 3462
  - MALABSORPTION
    - REVIEWS, 3441, 3442
  - OBESITY
    - TECHNIQUES, 3456
  - PANCREAS
    - NEOPLASMS, MALIGNANT, 3623, 3633, 3636, 3645
  - PANCREAS DISEASE
    - REVIEWS, 3644
  - PANCREATIC DUCT
    - PANCREATITIS, CHRONIC, 3650*
  - PANCREATITIS, 3655
  - PANCREATITIS, CHRONIC
    - SEQUELAE, 3659
  - PEPTIC ULCER
    - GASTRECTOMY, 3429
    - GLUCOSE, 3424
    - OBESITY, 3417
    - VAGOTOMY, 3429
  - PORTAL HYPERTENSION, 3796
    - CIRCULATION, 3276
  - RECTUM
    - NEOPLASMS, MALIGNANT, 3548, 3568, 3577
  - SHORT BOWEL SYNDROME
    - TECHNIQUES, 3535
  - SMALL INTESTINE
    - BACTERIA, 3213
    - BILE ACIDS, 3483*
    - COMPLICATIONS, 3213
    - HYPERCHLORHYDRIA, 3080
    - KINETICS, CELL, 2983
    - MALABSORPTION, 2982, 3441, 3442, 3462
    - MOTILITY, 3044
    - PROTEIN-LOSING ENTEROPATHY, 3441
    - REGENERATION, 2983
    - SEQUELAE, 3478, 3479
    - STEATORRHEA, 3441
    - TECHNIQUES, 3431*
  - ULCERATIVE COLITIS, 3611, 3612
  - VASCULAR
    - CIRRHOSIS, 3225

- SURVIVAL
  - APPENDICITIS
    - EPIDEMIOLOGY, 3604
  - COLON
    - NEOPLASMS, MALIGNANT, 3559, 3561, 3580
  - ENTEROCOLITIS
    - CHILDREN, 3880
  - ILEUS
    - MECONIUM, 3624
  - LIVER
    - TRANSPLANTATION, 3159
  - PEPTIC ULCER
    - EPIDEMIOLOGY, 3419
  - RECTUM
    - NEOPLASMS, MALIGNANT, 3559, 3580

- SYPHILIS
  - LIVER
    - MORPHOLOGY, 3723

- TELANGIECTASIA
  - JEJUNUM
    - BLEEDING, 3453
- TEMPERATURE
  - CECUM
    - ELECTROPHYSIOLOGY, 3050
    - MOTILITY, 3050
  - ILEUM
    - MOTILITY, 3040*
  - PEPTIC ULCER
    - BLEEDING, 3407
  - STOMACH
    - SECRETION, 3079*
- THERAPY
  - SEE ALSO SPECIFIC THERAPEUTIC METHODS AND AGENTS
  - AMYLOIDOSIS, 3881
  - ANORECTUM, 3586, 3588
  - BLEEDING, 3841
  - CHOLEDOCHOLITHIASIS, 3813, 3834
  - COLITIS, 3613
  - DIARRHEA, 3878
  - DUODENUM
    - ULCER, 3121*
  - ECHINOCOCCOSIS
    - LIVER, 3916
  - ENTERECTOMY
    - DIET, 3513
  - ENTEROCOLITIS
    - CHILDREN, 3857
  - ESOPHAGUS
    - CHEMICAL BURNS, 3331, 3353
    - SCLERODERMA, 3350
    - STRICTURE, 3327, 3353, 3354
  - GASTROINTESTINAL TRACT
    - BLEEDING, 3871
  - INTESTINE
    - ANASTOMOSIS, 3474
    - ISCHEMIA, 3221
  - LIVER DISEASE
    - PHOSPHOLIPID, 3698
  - MECONIUM
    - ILEUS, 3024
  - OXYGEN
    - PERITONITIS, 3862
  - PANCREAS
    - DISEASE, 3121*
    - NEOPLASMS, MALIGNANT, 3639
  - PANCREAS DISEASE, 3634
  - PANCREATITIS
    - NECROSIS, 3661
  - PEPTIC ULCER, 3422, 3423
  - PERITONITIS
    - FOREIGN BODIES, 3846, 3882
  - RECTUM
    - PROLAPSE, 3600
  - SHORT BOWEL SYNDROME, 3465
  - STOMACH
    - ANOMALY, CONGENITAL, 3363
  - ULCERATIVE COLITIS, 3615
- THROMBOSIS
  - INTESTINE
    - NECROSIS, 3564
  - LIVER INJURY
    - PEPTIDES, 3720
  - PANCREATITIS
    - ETIOLOGY, 3660
- THYROID
  - HEPATITIS, CHRONIC
    - DISEASES ASSOCIATED WITH, 3762
  - HORMONE
    - LIVER, 3183
    - METABOLISM, 3183
- TISSUE CULTURE
  - LIVER
    - BILE ACIDS, 3164
    - CORTICOSTEROIDS, 2966
    - ISOENZYMES, 3164
    - MORPHOLOGY, 3164
  - STOMACH
    - PENTAGASTRIN, 2965*
    - ULTRASTRUCTURE, 2965*
- TOLERANCE
  - ALCOHOL
    - DRUG EFFECTS ON, 3155
    - NERVOUS SYSTEM, 3155
- TOXICITY
  - ALCOHOL
    - AMINO ACIDS, 3180
  - LIVER
    - ALKLOIDS, 3156
    - INHIBITION, 3156
    - MICROSOMES, 3169
- TOXIN
  - JEJUNUM
    - DRUG ABSORPTION, 3035
- TRACE ELEMENT
  - ABSORPTION
    - DIETARY FACTORS, 3014
  - MALABSORPTION
    - ENTERECTOMY, 3511
- TRANQUILIZERS
  - ESOPHAGUS
    - ENDOSCOPY, 3296
  - HEPATITIS, CHRONIC
    - ETIOLOGY, 3766
  - STOMACH
    - ENDOSCOPY, 3296
- TRANSFUSION
  - HEPATITIS, VIRAL
    - TRANSMISSION, 3748
- TRANSPLANTATION
  - INTESTINE, 3482
    - IMMUNOLOGY, 3436*
    - REJECTION, 3436*
  - LIVER, 3685, 3820
    - CIRCULATION, 3226
    - REJECTION, 3159
    - SHUNT, 3226
    - SURVIVAL, 3159
    - TECHNIQUES, 3152
  - PANCREAS, 3227
    - TECHNIQUES, 3220
  - STOMACH
    - ACID SECRETION, 3107
    - PEPSIN SECRETION, 3107

- TRAUMA
  - BILE DUCT
    - SURGERY, 3815
  - DUODENUM
    - CHILDREN, 3627
  - ESOPHAGUS
    - ACID SECRETION, 3104
    - PERFORATION, 3329
  - LIVER, 3705
  - PANCREAS
    - AMYLASE, 3638
    - CHILDREN, 3627
    - COMPLICATIONS, 3641
    - DRUG TREATMENT, 3638
  - PANCREATITIS
    - PHYSICAL FACTORS, 3849
  - PEPTIC ULCER
    - BLEEDING, 3380*
  - STOMACH
    - ACID SECRETION, 3104

- TREATMENT
  - SEE THERAPY

- TRICHOSTRONGYLOSIS
  - EPIDEMIOLOGY, 3908

- TRIGLYCERIDE
  - DUODENUM
    - ACID SECRETION, 3074*
  - STOMACH
    - ACID SECRETION, 3074*

- TRIGLYCERIDE, MEDIUM CHAIN
  - INTESTINE
    - LYMPHANGIECTASIA, 3532
  - PROTEIN-LOSING ENTEROPATHY, 3532

- TUBERCULOSIS
  - DUODENUM
    - ANEMIA, PERNICIOUS, 3470
    - MALABSORPTION, 3470
  - LARGE INTESTINE
    - OBSTRUCTION, 3550
  - LIVER
    - BIOPSY, 3713
  - MESENTERY
    - LYMPHATICS, 3843

- ULCER
  - DUODENUM, 3418
    - ACID SECRETION, 3386*
    - BICARBONATE SECRETION, 3393
    - BLEEDING, 3407, 3411
    - CHILDREN, 3413
    - DIAGNOSIS, 3288, 3402
    - DRUG TREATMENT, 3397, 3421
    - ENDOSCOPY, 3271
    - PERFORATION, 3395
    - RADIOLOGY, 3271
    - RECURRENCE, 3398
    - SURGERY, 3417, 3424, 3450
    - THERAPY, 3121*
    - VAGOTOMY, 3384*
  - ESOPHAGUS, 3338
    - ADHESIONS, 3337
  - JEJUNUM, 3398
    - ANTIINFLAMMATORY AGENTS, 3481
    - STRICTURE, 3481
  - STOMACH
    - ASPIRIN, 3362
    - CYTOLOGY, EXFOLIATIVE, 3241*
    - DRUG THERAPY, 3389*
    - DRUG TREATMENT, 3420
    - PRESSURE STUDIES, 3387*

- ULCERATIVE COLITIS
  - SEE ALSO COLITIS
  - COLON
    - NEOPLASMS, MALIGNANT, 3576
  - DISEASES ASSOCIATED WITH
    - LIVER, 3617
    - MALABSORPTION, 3605*
    - NEOPLASMS, MALIGNANT, 3607*
    - PRECANCER, 3607*
  - ENDOSCOPY, 3233*
  - EPIDEMIOLOGY, 3609
  - ETIOLOGY, 3610
  - IMMUNOGLOBULINS, 3619
  - IMMUNOLOGY, 3484*, 3606*, 3608*
  - PREVENTION
    - ANTIBACTERIALS, 3614
  - RADIOLOGY
    - CONTRAST MEDIA, 3233*
  - SMALL INTESTINE
    - DISACCHARIDASE, 3539
    - MORPHOLOGY, 3605*
    - MOTILITY, 3605*
  - SURGERY, 3611, 3612
  - THERAPY, 3615

- ULCERATIVE ENTERITIS
  - ETIOLOGY
    - IMMUNOGLOBULINS, 3502*
  - IMMUNOGLOBULINS
    - DEFICIENCY, 3502*

- ULTRASTRUCTURE
  - CROHNS DISEASE
    - TECHNIQUES, 3496
  - DUODENUM
    - ENZYMES, 2991
    - LIPIDS, 2991
  - ESOPHAGUS
    - NEOPLASMS, MALIGNANT, 3319
  - HEPATITIS
    - VIRUS, 3759
  - HEPATITIS, VIRAL, 3742
  - ILEUM, 2999
  - INTESTINE
    - CATECHOLAMINES, 2998
  - JEJUNUM
    - CELIAC DISEASE, 3506*
    - ENZYMES, 2991
    - LIPIDS, 2991
  - LIVER
    - BERYLLIUM, 3161
    - CHEMICAL COMPOSITION, 3184
    - CHOLESTASIS, 3184
    - ENZYMES, 3132*
    - HEPATITIS, CHRONIC, 3754
    - HEPATITIS, SERUM, 3754
    - HYALIN, 3689
    - INJURY, 2970
    - ISOENZYMES, 3157
    - LIVER DISEASE, ALCOHOLIC, 3783
    - NIEMANN-PICK DISEASE, 3696
    - POLYCYCLIC HYDROCARBONS, 3144

    - REGENERATION, 3161
    - SEDATIVES, 3148, 3149
    - TECHNIQUES, 2997
  - PANCREAS
    - POLYCYCLIC HYDROCARBONS, 2978
    - SECRETIN, 3123
    - SPECIES DIFFERENCES, 2996
  - SALIVARY GLANDS
    - NERVOUS SYSTEM, 2993
  - SMALL INTESTINE
    - ENZYMES, 3210
    - HORMONE, 3192*
    - NERVOUS SYSTEM, 2995
    - STRANGULATION, 3430*
    - WHIPPLES DISEASE, 3433*
  - STOMACH
    - ANEMIA, PERNICIOUS, 3358*
    - TISSUE CULTURE, 2965*

- URINE
  - AMYLASE
    - PANCREAS DISEASE, 3620*

- UROGENITAL SYSTEM
  - CROHNS DISEASE
    - COMPLICATIONS, 3492
  - HEPATITIS, CHRONIC
    - SEQUELAE, 3763

- VAGOTOMY
  - DIAGNOSIS
    - ELECTROPHYSIOLOGY, 3232*
  - DUODENUM
    - ULCER, 3384*
  - PEPTIC ULCER
    - SURGERY, 3429
  - SEQUELAE
    - ACUPUNCTURE, 3409
    - CHOLELITHIASIS, 3252
    - DIARRHEA, 3403
  - STOMACH
    - ACID SECRETION, 3384*, 3385*, 3388*
    - ENDOSCOPY, 3414

- VARICES
  - ESOPHAGUS
    - ACHALASIA, 3343
    - BLEEDING, 3343
    - CIRRHOSIS, 3794

- VASOPRESSIN
  - BILE
    - SECRETION, 3137

- VIRUS
  - HEPATITIS
    - ULTRASTRUCTURE, 3759

- VITAMIN A
  - PEPTIC ULCER
    - STRESS, 3416

- VITAMIN B12
  - ABSORPTION
    - BLIND LOOP SYNDROME, 3510*
    - CORTICOSTEROIDS, 3356*
    - MALNUTRITION, 3517
  - BACTERIA
    - BLIND LOOP SYNDROME, 3510*
  - DEFICIENCY
    - ANEMIA, 3519
    - MALABSORPTION, 3519
  - MALABSORPTION
    - ANTIBACTERIALS, 3503*

- VITAMIN D
  - CALCIUM
    - METABOLISM, 3200*
  - CELLS
    - KINETICS, 3203
  - SMALL INTESTINE
    - MORPHOLOGY, 3203
  - STOMACH
    - MOTILITY, 3038*

- VITAMIN E
  - MALABSORPTION
    - GASTROINTESTINAL DISEASE, 3509*
    - LIVER DISEASE, 3509*

- VITAMIN K
  - LIPIDS
    - METABOLISM, 3166
  - LIVER
    - MICROSOMES, 3166

- VOLVULUS
  - COLON
    - HAMARTOMA, 3546
  - SMALL INTESTINE
    - DISEASES ASSOCIATED WITH, 3476

- VOMITING
  - ANESTHESIA
    - COMPLICATIONS, 3045
  - ETIOLOGY
    - VIRUS, 3851

- WATER
  - ABSORPTION
    - AMINO ACIDS, 3005*
    - CHOLECYSTOKININ, 3004*
    - GALLBLADDER, 3016
    - PEPTIDES, 3005*
    - SECRETION, 3004*

- WHIPPLES DISEASE
  - DISEASES ASSOCIATED WITH
    - SARCOIDOSIS, 3524
  - SMALL INTESTINE
    - BIOPSY, 3524
    - IMMUNOLOGY, 3433*
    - ULTRASTRUCTURE, 3433*

- WILSONS DISEASE
  - DIAGNOSIS, 3673*

- ZENKERS DIVERTICULUM, 3335

- ZOLLINGER-ELLISON SYNDROME
  - DISEASES ASSOCIATED WITH, 3835*
  - ETIOLOGY, 3895
  - PANCREAS
    - SECRETION, 3621*
  - STOMACH
    - PARIETAL CELL, 3835*
    - PEPSIN, 3835*
    - SECRETION, 3866

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GASTROENTEROLOGY

ABSTRACTS
AND
CITATIONS

NATIONAL INSTITUTE OF ARTHRITIS, METABOLISM, AND DIGESTIVE DISEASES

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PREFACE

GASTROENTEROLOGY ABSTRACTS and CITATIONS is a publication of the National Institute of Arthritis, Metabolism and Digestive Diseases. This specialized information medium has been initiated to fill an existing great need in the field of gastroenterology and to assist the Institute in meeting its obligations to foster and support laboratory and clinical research into the nature, causes, and therapy of diseases of the gastrointestinal tract. Publication GASTROENTEROLOGY ABSTRACTS and CITATIONS makes available citations of all current papers relevant to this field from medical journals published throughout the world. Approximately one-third of the citations dealing with the major aspects of gastroenterology have accompanying abstracts.

The issuing of GASTROENTEROLOGY ABSTRACTS and CITATIONS under the auspices of the National Institute of Arthritis, Metabolism, and Digestive Diseases will provide a much needed current awareness tool to scientists and will facilitate greater integration of research and clinical efforts in this field. The number and great diversity of publications in the area of gastroenterology makes it imperative that an appropriate service be available to investigators and practitioners so that they may be apprised of progress with a minimum of delay. Our aim is to provide the readers with a readily systematized compliilation of current published work. The publication will provide the greatest usefulness if these interested investigators will contribute their ideas and comments for consideration whenever possible.

GASTROENTEROLOGY ABSTRACTS and CITATIONS is published monthly and includes citations and abstracts from the biomedical world literature as they are currently received. Volume 7 will appear in, and be dated, 1973. There will be no hiatus in literature coverage from Volume 6 which was dated 1971. In addition, yearly cumulated subject and author indexes are published.

This publication is available free to National Institutes of Health grantees and contractors working in the field of gastroenterology and libraries of medical schools. Requests from these qualified individuals to receive free copies of this publication must include their grant or contract number and the title of their project. These requests as well as address changes and other communications should be addressed to:

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CONTENTS

	Abstracts, Citations	Page
PRE-CLINICAL SCIENCES		
Morphology, Cellular Structure and Histochemistry	3924-3974	351
Absorption--Excretion--Transport	3975-4022	356
Motility	4023-4054	363
Secretion and Metabolism	4055-4061	366
Stomach	4062-4089	367
Pancreas	4090-4113	371
Hepatobiliary Tract	4114-4155	375
Intestine	4156-4200	380
General	4201-4224	385
DIAGNOSTIC PROCEDURES	4225-4293	388
GASTROINTESTINAL DISEASES		
Esophagus	4294-4331	394
Stomach	4332-4361	397
Peptic Ulcers	4362-4412	399
Small Intestine	4413-4474	404
Regional Enteritis	4475-4487	409
Malabsorption	4488-4522	411
Large Intestine	4523-4586	415
Ulcerative Colitis	4587-4599	421
Pancreas	4600-4627	423
Pancreatitis	4628-4660	425
Liver and Biliary Tract	4661-4700	428
Hyperbilirubinemic States	4701-4711	433
Nonviral Hepatitis and Hepatic Injury	4712-4724	435
Acute Viral Hepatitis	4725-4753	437
Chronic Hepatitis	4754-4762	442
Alcoholic Liver Disease	4763-4768	444
Cirrhosis	4769-4793	445
Gallbladder and Biliary Tract Diseases	4794-4833	449
General	4834-4912	455
Parasitology	4913-4945	463
AUTHOR INDEX		
SUBJECT INDEX		

The Secretary of the Department of Health, Education, and Welfare has determined that the publication of this periodical is necessary in the transaction of the public business required by law of this Department. Use of funds for printing this periodical has been approved by the Director of the Office of Management and Budget through April 30, 1975.

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NOTE

Journal names are abbreviated according to the list of abbreviations used by *Index Medicus*. For journals not covered by *Index Medicus*, the abbreviations (with some modifications) found in *World Medical Periodicals*, 3rd Edition, are used.

LANGUAGE ABBREVIATIONS

Afr.	Afrikaans	It.	Italian
Ar.	Arabic	Jap.	Japanese
Bul.	Bulgarian	Kor.	Korean
Ch.	Chinese	Latv.	Latvian
Cz.	Czech	Lith.	Lithuanian
Dan.	Danish	Nor.	Norwegian
Dut.	Dutch	Pol.	Polish
E.	English	Por.	Portuguese
Eston.	Estonian	Rum.	Rumanian
Fin.	Finnish	Rus.	Russian
Fl.	Flemish	Ser.	Serbo-Croatian
Fr.	French	Sl.	Slovak
Ger.	German	Sp.	Spanish
Gr.	Greek	Sw.	Swedish
Heb.	Hebrew	Th.	Thai
Hun.	Hungarian	Turk.	Turkish
Ic.	Icelandic	Uk.	Ukrainian
In.	Indonesian	Viet.	Vietnamese

ABBREVIATIONS USED IN ABSTRACTS

ACTH	adrenocorticotropic hormone	mC,μC	milli-,microcurie(s)
ADP	adenosine diphosphate	mg	milligram(s)
AMP	adenosine monophosphate	min	minute(s)
ATP	adenosine triphosphate	ml	milliliter(s)
BSP	sulfobromophthalein	mm	millimeter(s)
C	degrees centigrade	MTD	maximum tolerated dose
cm	centimeter(s)	ng	nanogram (10^{-9})
CNS	central nervous system	pg	picogram (10^{-12})
cpm	counts per minute	p.o.	orally
DNA	deoxyribonucleic acid	ppm	parts per million
e.g.	for example	r	Roentgen
g	gram(s)	RBC	red blood cells (erythrocytes), red blood count
μg	microgram(s)	resp.	respectively
hr	hour(s)	Rev.	review (only in citations)
i.m.	intramuscular	RNA	ribonucleic acid
i.p.	intraperitoneal	s.c.	subcutaneous
IU	international unit(s)	sec	second(s)
i.v.	intravenous	SGOT	serum glutamic-oxalacetic transaminase
kg	kilogram(s)	SGPT	serum glutamic-pyruvic transaminase
LD_{50}	median lethal dose(s)	U	unit(s)
LDH	lactic acid dehydrogenase	UV	ultraviolet
m	meter(s)	WBC	white blood cells (leukocytes), white blood count
M	molar	yr	year(s)
mEq	milliequivalent(s)		
mM	millimolar		
μM	micromolar		

PRE-CLINICAL SCIENCES

MORPHOLOGY, CELLULAR STRUCTURE AND HISTOCHEMISTRY

3924 CELLULAR LOCALIZATION OF GASTRONE IN GASTRODUODENAL MUCOSA BY IMMUNOFLUORESCENCE. *(E.)* Glass, G. B. J.; Balanzo, J. T.; Rosenthal, W. S. (New York Med. Coll., New York, N.Y.). *Am. J. Dig. Dis.* 18(4):279-288, 1973.

Because of the previously demonstrated immunologic and biologic activity of a precipitating antibody to gastrone B, this antibody was used in immunofluorescence tests for cellular localization of gastrone in the gastroduodenal mucosa of man and dog. The antibody was produced in rabbits immunized with fraction 7 from the Sephadex G-100 gel filtration of anacid human gastric juices. In the indirect Coombs' test with fluorescein-labeled antirabbit IgG and rabbit antigastrone B serum, fluorescence appeared in the pyloric glands and surface epithelium of the antrum in man and dog and in the villous epithelium and crypts of the duodenal bulb mucosa in the dog. These structures are the main sites of cellular origin of gastrone B in these two species. No immunofluorescence was observed in the antrum of man or in the antrum and duodenal bulb of the dog when normal rabbit or human serum was used in control tests. The fundal glands in humans and dogs do not show fluorescence and are known not to produce gastrone B. The surface epithelium of the fundus of the human and dog stomach gave a faint immunofluorescence both with antigastrone B and with normal rabbit sera, which could be nonspecific in nature. In the human mucosa this fluorescence could have been caused by the presence of blood group substances in the surface epithelium.

3925 MEASUREMENT OF BILE DAMAGE TO THE GASTRIC MUCOSA. THE RELATION BETWEEN THE ELECTRICAL POTENTIAL DIFFERENCE AND TRANSMUCOSAL MOVEMENT OF HYDROGEN AND SODIUM ION. *(E.)* Black, R. B.; Rhodes, J.; Hole, D. (Welsh Natl. Sch. Med., Cardiff, Wales). *Am. J. Dig. Dis.* 18(5):411-415, 1973.

Bile damage to gastric mucosa was investigated in dogs with Heidenhain pouches. Measurements were made of changes in the movement of sodium and hydrogen ion across the mucosa, and of transmucosal potential difference before and after contact with bile. There was a relation, although it was not close, between the transmucosal potential difference and ionic flux. After contact with bile, the mean potential difference correlated well with both sodium and hydrogen fluxes. Furthermore, there was a significant correlation between changes in the mean potential difference and changes in the back-diffusion of hydrogen (but not of sodium) ion after contact of the gastric mucosa with bile. Changes in both potential difference and ionic flux probably indicate a similar type of mucosal damage.

3926 HEPATIC LIPID DROPLETS. ISOLATION, MORPHOLOGY AND COMPOSITON. *(E.)* DiAugustine, R. P.; Schaefer, J. M.; Fouts, J. R. (Natl. Inst. Environ. Health Sci., Res. Triangle Park, N.C.). *Biochem. J.* 132(2):323-327, 1973.

The composition and ultrastructure of the floating lipid layer isolated by centrifugation of rat liver were examined. This layer was chiefly composed of triglycerides and cholesterol esters with much smaller amounts of free cholesterol, diglycerides, phospholipid, and protein. No free fatty acids were detected. The triglyceride fractions consisted mostly of esters of linoleic (33.7%), oleic (30.2%), and palmitic (24.7%) acids. These acids also contributed the major esters for the cholesterol ester fraction. Electron micrographs of the floating lipid layer revealed numerous spherical osmiophilic droplets having a mean diameter of 0.5-2 µm with a very thin, dense outer coat. Similar structures were observed as organelles in electron micrographs of the intact liver cell. The Amount of triglyceride in the lipid layer decreased in rats starved for 72 hr, but pellet triglyceride (homogenate minus the floating lipid layer) was unchanged. These results suggest that the floating lipid layer is the representative *in vitro* of lipid-rich organelles which probably function as a depot form of neutral lipid in the liver cells.

3927 THE IRON-BINDING GLYCOPROTEIN OF HUMAN GASTRIC JUICE. I. ISOLATION AND CHARACTERIZATION. *(E.)* Rudzki, A.; Deller, D. J. (Dept. Med., Univ. Adelaide, Australia). *Digestion* 8(1):35-52, 1973.

Human gastric juice has the ability to maintain iron in solution at elevated pH. An iron-binding substance has been isolated from pooled normal gastric juice by removal of sulphated glycoproteins with cetylpyridinium chloride complexing, precipitation with acetone, chromatography on DEAE cellulose, and gel filtration on Sephadex G-200. Ultracentrifugation showed the product is homogenous. Acid hydrolysis revealed that the iron-binding substance was a glycoprotein containing approximately 90% sugar residues and 10% amino acid residues. Five sugars and 14 amino acids were identified. Serine, proline, threonine, glycine, and alanine together constituted 70% of the total amino acid content. This glycoprotein was a soluble blood group substance. However, it is likely that iron-binding and blood group activities are located at different sites on the molecule since saturation of the glycoprotein with iron did not affect blood group activity and blocking of blood group sites with hemagglutinin did not affect iron binding.

3928 THE IRON-BINDING GLYCOPROTEIN OF HUMAN GASTRIC JUICE. II. NATURE OF THE INTERACTION OF THE GLYCOPROTEIN WITH IRON. *(E.)* Rudzki, Z.; Baker, R. J.; Deller, D. J. (Dept.

Med., Univ. Adelaide, Australia). *Digestion* 8(1):53-67, 1973.

Interaction between a gastric iron-binding glycoprotein and iron has been studied. Much of the iron could be separated from the glycoprotein by filtration and centrifugation. Magnetic susceptibility measurements revealed polymerized ferric hydroxide in the iron glycoprotein complex. Such iron particles were subsequently visualized by electron microscopy. No absorption peaks or shifts which could be attributed to the chemical interaction of iron and some group on the glycoprotein were visible. Hence it is concluded that the glycoprotein exerts its influence by maintaining colloidal iron particles in suspension. Iron was significantly better absorbed in rats from the iron glycoprotein complex than from an acid solution of ferric chloride. The absorption of iron from the complex was of the same order as absorption from neutral solutions of iron-containing ascorbate. It is suggested that, since other naturally occurring molecules form complexes with iron preferentially, since ingested iron must first pass through the acid stomach environment, and since neutralization in the duodenum results in iron complexes with citrate or ascorbate, iron is not available for action with this gastric glycoprotein. Therefore, the glycoprotein is of no significance in the physiology of iron absorption.

3929 MORPHOLOGICAL EVIDENCE FOR THE RELEASE OF CHYLOMICRA FROM INTESTINAL ABSORPTIVE CELLS. *(E.)* Friedman, H. I.; Cardell, Jr., R. R. Sch. Med., Univ. Virginia, Charlottesville). *Exp. Cell Res.* 75(1):57-62, 1972.

Increased transport of chylomicra from the intestinal absorptive cell to the intercellular space was noted during a study of abrupt termination of micellar lipid absorption in male rats. Absorptive cells from intestinal segments removed soon after flushing fat from the gut lumen revealed Golgi vacuoles containing lipid in various stages of fusion with the lateral plasma membrane. At the point of this fusion a perforation occurs, connecting the vacuole interior with the intercellular space. This increases in size and becomes large enough for the fat droplet to move into the extracellular fluid. Coupled with experimental evidence derived from studies of the normal absorptive process, these experiments support the view that chylomicra are released from the absorptive cell by exocytosis of Golgi vacuoles.

3930 COMPARATIVE ELECTRON MICROSCOPIC FEATURES OF NORMAL, HYPERPLASTIC, AND ADENOMATOUS HUMAN COLONIC EPITHELIUM. VARIATIONS IN CELLULAR STRUCTURE RELATIVE TO THE PROCESS OF EPITHELIAL DIFFERENTIATION. *(E.)* Kaye, G. I.; Fenoglio, C. M.; Pascal, R. R.; Lane, N. (Coll. Phys. Surg., Columbia Univ., New York, N.Y.). *Gastroenterology* 64(5):926-945, 1973.

The cytology of well defined examples of the epithelium of normal human colonic mucosa, hyperplastic polyps, and adenomatous lesions is compared at several crypt levels. The normal epithelium exhibits a regular pattern of differentiation as cells migrate from the base of the crypt to the free surface. Progressive maturation is seen from undifferentiated cells at the base of the crypt to intermediate and immature goblet and absorptive cells in the midcrypt and, finally, to fully mature and even senescent goblet and absorptive cells in the upper 1/3 of the crypt and at the free surface. The hyperplastic epithelium exhibits a similar progression, except that most of the morphological features of maturing and mature cells are found either lower in the crypt or in exaggerated form at the same level of the crypt when compared with normal mucosa from the same colon. The adenomatous epithelium, however, rarely differentiates past the intermediate, partially differentiated cell stage, retaining both the morphological and replicative characteristics of this immature cell type. Of the 2 types of polyps, only the adenomatous exhibits characteristics of true neoplasia and is therefore potentially significant in the evolution of carcinoma.

3931 STUDIES OF PORCINE SECRETORY IgA AND ITS COMPONENT CHAINS IN RELATION TO INTESTINAL ABSORPTION OF COLOSTRAL IMMUNOGLOBULINS BY THE NEONATAL PIG. *(E.)* Porter, P. (Unilever Res. Lab., Bedford, England). *Immunology* 24(1):163-176, 1973.

After reductive dissociation of secretory immunoglobulin (Ig) A, porcine secretory component was identified and isolated in free form from sow's milk. In the light chain fraction of reduced and alkylated porcine secretory IgA electrophoretically fast polypeptide chains were detected. These probably relate to J chain and were immunologically and electrophoretically distinct from secretory component. In the light chain fractions of reduced and alkylated porcine 7S IgG and 6.4S IgA, J chains were not present. Porcine colostral IgA occurs in a wide range of molecular sizes, and IgA lacking secretory component having $S_{20,w}$ 6.4 and 9.3 was isolated from colostrum and serum of suckling piglets. Only a very small proportion of the IgA derived from colostrum is 10.6S IgA with secretory component, as demonstrated by a hemagglutination inhibition assay for 10.6S secretory IgA with specific rabbit anti-porcine secretory component.

3932 BIOCHEMICAL AND HISTOCHEMICAL STUDIES OF THE SELENIUM-DEFICIENT PANCREAS IN CHICKS. *(E.)* Noguchi, T.; Langevin, M. L.; Combs, Jr., G. F.; Scott, M. L. (Grad. Sch. Nutr., Cornell Univ., Ithaca, N.Y.). *J. Nutr.* 103(3):444-453, 1973.

Selenium deficiency uncomplicated by vitamin E deficiency was produced in chicks with an amino acid diet complete in all known nutrients except selenium. The development of deficiency signs was followed grossly, biochemically, and histochemically. The first stage of selenium deficiency resulted in growth retardation beginning after the first 2 weeks on the diet and marked by particularly poor growth of muscle, liver, and pancreas. These signs appeared in the chicks at 15 days of age. Early in week 4 of the experiment, pathological changes were seen in the pancreas. Histochemical studies showed invasion by fibroblasts and macrophages which stained strongly for acid phosphatase. At this stage the pancreas showed a very low level of zymogen while specific activities of the pancreatic lysosomal enzymes increased. Cathepsin and acid phosphatase accumulated in the pancreas regardless of diet for the first 23 days. Thereafter no enzyme accumulation occurred in chicks on the selenium-deficient diet. During week 5, the pancreatic zymogen level dropped to that of 1-day old chicks. Histochemical and biochemical studies throughout the entire experimental period showed no sign of lysosomal disruption in the acinar cells or in the invading cells, demonstrating that the function of selenium in protecting the pancreas from atrophy and fibrosis does not result from its protection of lysosomal membranes in pancreatic cells.

3933 APPENDIX AND γM-ANTIBODY FORMATION. VI. THE FUNCTIONAL ANATOMY OF THE RABBIT APPENDIX. *(E.)* Waksman, B. H.; Ozer, H. Blythman, H. E. (Yale Univ. Sch. Med., New Haven, Conn.). *Lab. Invest.* 28(5):614-626, 1973.

Histologic analysis of the rabbit appendix, sacculus rotundus at the ileocecal junction, and Peyer's patches in the wall of the ileum reveals 3 morphologically and functionally distinct elements in each: a dome with attached corona; a thymus-dependent area containing postcapillary venules; and a follicle, in addition to "mushrooms" of conventional bowel mucosa. The dome and follicle can be separated mechanically, with partitioning of the thymus-dependent area. Large numbers of intra- and extracellular microorganisms are prominent throughout the dome, corona, and follicle. The dome consists largely of medium and large lymphocytes mixed with blast cells and a few small lymphocytes. The corona contains small lymphocytes but no blast cells or mitoses. Some bacteria-containing macrophages are present. This is a highly variable zone. The follicle outline is clear-cut and contains many small lymphocytes and some larger cells, few mitoses, numerous bacteria-containing macrophages, and blasts. The dome may be a central lymphoid organ giving rise to immuno-competent B-lymphocytes and the follicle a nonspecific amplifying organ for B-cells coming from the dome and stimulated by endotoxin provided by microorganisms of the lumen.

3934 THE EFFECTS OF LARGE OSMOLALITY VARIATIONS ON THE GASTRIC MUCOSAL SURFACE ULTRASTRUCTURE. *(E.)* Frenning, B. (Dept. Physiol., Univ. Uppsala, Sweden). *Scand. J. Gastroenterol.* 8(2):185-192, 1973.

An examination was made of the effect of hyperosmotic NaCl solution on the ultrastructure of the gastric mucosal surface using the scanning electron microscope. Cat stomachs were exposed to hyperosmotic NaCl solution and were then either fixed, or first exposed to 170 mM HCl and fixed thereafter. The surface morphology of gastric mucosa exposed to 620 mM NaCl was essentially normal except for a few loose or disrupted cells. When 170 mM HCl was instilled into a stomach previously exposed to 620 mM NaCl, a significant increase in volume and a net flux of sodium ions into the gastric lumen resulted. Disruption of cells and round openings located intercellularly was found on specimens from stomachs exposed to 1550 mM NaCl. Cellular shrinkage was not a common occurrence. As an effect of exposure of the mucosa to 170 mM HCl subsequent to 1550 mM NaCl, cellular swelling and disruption of cells occurred. It is concluded that a posthyperosmotic disruption of cells occurs *in vivo.*

3935 DETAILED DISTRIBUTION OF LYMPHATICS IN THE PANCREAS. *(Jap.)* Kaneko, K. (Tokyo Med. Coll., Japan). *Acta Anat. Nippon.* 47(3):205-221, 1972.

3936 IMMUNOFLUORESCENT STAINING OF MUCOSAL GLYCOPROTEIN OF HUMAN INTESTINAL MUCOSA. *(E.)* Kawasaki, H.; Imasato, K.; Nakayama, K.; Akiyama, K.; Kimoto, E.; Takeuchi, M. (Kurume Univ. Sch. Med., Japan). *Acta Histochem. Cytochem* 5(1): 26-32, 1972.

3937 DIFFERENTIATION OF ALPHA CELLS IN THE FETAL RAT PANCREAS GROWN IN ORGAN CULTURE. *(E.)* Schweisthal, M. R.; Frost, C. C. (Sch. Med., East Carolina Univ., Greenville, N.C.). *Am. J. Anat.* 136(4):527-532, 1973.

3938 UPTAKE OF ADENOVIRUS BY INTESTINAL ABSORPTIVE CELLS OF THE SUCKLING RAT. I. THE NEONATAL ILEUM. *(E.)* Worthington, B. B.; Graney, D. O. (Univ. Washington, Sch. Med., Seattle). *Anat. Rec.* 175(1):37-62, 1973.

3939 THE IRON CONTENT OF INTESTINAL EPITHELIAL CELLS AND ITS SUBCELLULAR DISTRIBUTION: STUDIES ON NORMAL, IRON-OVERLOADED AND IRON-DEFICIENT RATS. *(E.)* Richmond, V. S.; Worwood, M.; Jacobs, A. (Welsh Natl. Sch. Med., Cardiff). *Br. J. Haematol.* 23:605-614, 1972.

3940 ENDOTHELIAL CONTRACTION IN VIVO: A STUDY OF THE RAT MESENTERY. *(E.)* Joris, I.; Majno, G.; Ryan, G. B. (Dept. Pathol., Univ. Geneva, Switzerland). *Virchows Arch. (Zellpathol.)* 12(1):73-83, 1972.

3941 ORGAN CULTURE OF HUMAN RECTAL MUCOSA. *(E.)* Eastwood, G. L.; Trier, J. S. (Boston Univ. Sch. Med., Mass.). *Gastroenterology* 64(3):375-382, 1973.

3942 DETECTION AND LOCALIZATION OF VIRUSES IN HUMAN FETAL INTESTINAL ORGAN CULTURES BY IMMUNOFLUORESCENCE. *(E.)* Dolin, R.; Blacklow, N. R.; Wyatt, R. G.; Sereno, M. M. (Natl. Inst. Allergy Infect. Dis., Bethesda, Md.). *Infect. Immunity* 6(6):958-964, 1972.

3943 AVAILABILITY OF LOCALLY SYNTHESIZED AND SYSTEMIC ANTIBODIES IN THE INTESTINE. *(E.)* Fubara, E. S.; Freter, R. (Univ. Michigan, Ann Arbor). *Infect. Immunity* 6(6):965-981, 1972.

3944 STRUCTURE AND FUNCTION OF INTESTINAL EPITHELIAL CELLS FROM COMPENSATED SMALL BOWEL FOLLOWING MASSIVE INTESTINAL RESECTION. *(E.)* Wilmore, D. W.; Holtzapple, P. G. (Univ. Pennsylvania Sch. Med., Philadelphia). *J. Surg. Oncol.* 4(5/6): 454-459, 1972.

3945 ULTRASTRUCTURAL CHANGES IN HEPATIC CELLS OF THE MALE RAT INDUCED BY DL-ETHIONINE. *(E.)* Goldblatt, P. J.; Gillies, C. G.; Older, A. (Univ. Pittsburgh Sch. Med., Pa.). *Lab. Invest.* 28(2):206-216, 1973.

3946 EFFECTS OF THE ADMINISTRATION OF SINGLE AMINO ACIDS ON RIBOSOME AGGREGATION IN RAT LIVER. *(E.)* Park, O. J.; Henderson, L. M.; Swan, P. B. (Dept. Biochem., Univ. Minnesota, St. Paul). *Proc. Soc. Exp. Biol. Med.* 142(3):1023-1024, 1973.

3947 SURFACE STUDIES OF ACUTE RADIATION INJURY IN THE MOUSE INTESTINE. *(E.)* Carr, K. E.; Toner, P. G. (Dept. Anat., Univ. Glasgow, Scotland). *Virchows Arch. (Zellpathol.)* 11(3): 201-210, 1972.

3948 ULTRASTRUCTURAL CHANGES IN THE RAT LIVER FOLLOWING PROTRACTED TREATMENT WITH PREGNENOLONE-16α-CARBONITRILE. *(E.)* Garg, B. D.; Kovacs, K.; Tuchweber, B. (Inst. Med. Exp. Surg., Univ. Montreal, Canada). *Virchows Arch. (Zellpathol.)* 12(1):61-72, 1972.

3949 CELLULAR AUTOPHAGY AND CELL ATROPHY IN THE RAT LIVER DURING LONG-TERM STARVATION: A QUANTITATIVE MORPHOLOGICAL STUDY WITH REGARD TO DIURNAL VARIATIONS. *(E.)* Pfeifer, U. (Pathol. Inst., Univ. Wurzburg, Germany). *Virchows Arch. (Zellpathol.)* 12(3):195-211, 1973.

3950 STUDIES ON THE STRUCTURE OF ANIMAL RIBOSOMES. III. ELECTRON MICROSCOPIC INVESTIGATIONS OF ISOLATED RAT LIVER RIBOSOMES AND THEIR SUBUNITS. *(E.)* Lutsch, G.; Bielka, H.; Wahn, K.; Stahl, J. (Inst. Molecular Biol., German Acad. Sci., Berlin). *Acta Biol. Med. Germ.* 29(6): 851-876, 1972.

3951 A CONTRIBUTION TO THE KNOWLEDGE OF THE VARIATIONS OF THE ANTERIAL SUPPLY OF THE DUODENUM AND THE PANCREAS IN THE DOG. *(E.)* Gomercic, H.; Babic, K. (Vet. Fac., Univ. Zagreb, Yugoslavia). *Anat. Anz.* 132(3/4):281-288, 1972.

3952 LIVER HISTOCHEMICAL CHANGES AFTER HEPATIC ARTERY LIGATION IN RATS. *(E.)* Kaltiala, E. H.; Rasanen, O. (Dept. Surg., Univ. Oulo, Finland). *Ann. Chir. Gynaecol. Fenn.* 61:160-166, 1972.

3953 MORPHOMETRIC STUDY OF ULTRASTRUCTURAL CHANGES INDUCED IN RAT LIVER BY CHRONIC ALCOHOL INTAKE. *(E.)* Oudea, M. C.; Collette, M.; Oudea, P. (Univ. Hosp. Ctr., Nantes, France). *Am. J. Dig. Dis.* 18(5):398-402, 1973.

3954 FLUORESCENCE OF MOUSE LIVER AT NORMAL TEMPERATURES AND WITH COOLING. *(Rus.)* Shliakhtina, L. S.; Gurvich, A. A. (Inst. Norm. Pathol. Physiol., Moscow, USSR). *Biofizika* 17(6):1088-1092, 1972.

3955 STUDY OF THE PERMEABILITY OF THE INTERHEPATOCYTIC SPACES TO LANTHANUM DURING THE PERINATAL PERIOD IN THE MOUSE. *(Fr.)* Perissel, B.; Geneix, A. (no affil.). *C. R. Soc. Biol. (Paris)* 166(6/7):866-868, 1972.

3956 EFFECTS OF ACTINOMYCIN D ON THE NUCLEIC ACIDS OF THE SUBNUCLEAR FRACTIONS: NUCLEOLAR AND CHROMATID FRACTIONS OF RAT LIVER. *(Fr.)* Wintzerith, M.; Ittel, M. E.; Mandel, P. (no affil.). *C. R. Soc. Biol. (Paris)* 166(6/7):942-946, 1972.

3957 THE LIVER DAMAGING EFFECT OF L-ASPARAGINASE: AN EXPERIMENTAL STUDY OF CHRONIC TOXICITY. *(E.)* Celle, G.; Doder, M.; Pannacciulli, I. (Sci. Inst. Intern. Med., Univ. Genoa, Italy). *Eur. J. Cancer* 9(1):55-57, 1973.

3958 STUDY OF ARTERIOVENOUS ANASTOMOSES IN THE SUBMUCOSA OF THE STOMACH IN DOGS.

(Pol.) Karmanski, J.; Karmanska, W.; Pisarski, A. (Silesian Acad. Med., Katowice, Poland). *Folia Morphol. (Warsz.)* 31(4):545-551, 1972.

3959 ELECTRON MICROSCOPICAL STUDY ON THE INFLUENCE OF THE PREPARATIVE CONDITIONS ON CONTOUR LENGTH AND STRUCTURE OF MITOCHONDRIAL DNA OF MOUSE LIVER. *(E.)* Wellauer, P.; Weber, R.; Wyler, T. (Zool. Inst., Univ. Bern, Switzerland). *J. Ultrastruct. Res.* 42(3/4):377-393, 1973.

3960 QUANTITATIVE ANALYSIS OF CELL POPULATION IN MOUSE INTESTINAL EPITHELIUM USING CITRIC ACID. *(E.)* Tsubouchi, S.; Matsuzawa, T. (Aichi Cancer Ctr. Res. Inst., Nagoya, Japan). *Proc. Soc. Exp. Biol. Med.* 142(4):1301-1305, 1973.

3961 NUMERICAL AND DISTRIBUTIONAL INEQUALITIES BETWEEN THE OXIDOREDUCTASE-POSITIVE GASTRIC PARIETAL CELLS IN NORMAL RATS. *(E.)* Barbarino, F.; Popescu, S. (Inst. Public Health Med. Res., Cluj, Roumania). *Rev. Roum. Biochim.* 9(4):293-298, 1972.

3962 POSTOPERATIVE INTRAVENOUS NUTRITION: EFFECTS ON BODY WEIGHT, PROTEIN REGENERATION, WOUND HEALING, AND LIVER MORPHOLOGY. *(E.)* Steiger, E.; Daly, J. M.; Allen, T. R.; Dudrick, S. J.; Vars, H. M. (Univ. Pennsylvania Sch. Med., Philadelphia). *Surgery* 73(5):686-691, 1973.

3963 MOTILIN, A GASTRIC MOTOR ACTIVITY STIMULATING POLYPEPTIDE: THE COMPLETE AMINO ACID SEQUENCE. *(E.)* Brown, J. C.; Cook, M. A.; Dryburgh, J. R. (Dept. Physiol., Univ. British Columbia, Vancouver, Canada). *Can. J. Biochem.* 51(5):533-537, 1973.

3964 EFFECTS OF AFLATOXIN B_1 ON THE FORMATION OF SUBRIBOSOMAL PARTICLES IN RAT LIVER. *(E.)* Moule, Y. (Inst. Sci. Res. Cancer, Villejuif, France). *Cancer Res.* 33(3):514-520, 1973.

3965 IN VIVO EFFECTS OF PROTEASES ON CELL SURFACE ARCHITECTURE AND CELL PROLIFERATION IN THE LIVER. *(E.)* Yamamoto, K.; Omata, S.; Ohnishi, T.; Terayama, H. (Zool. Inst., Fac. Sci., Univ. Tokyo, Japan). *Cancer Res.* 33(3):567-572, 1973.

3966 SAPONIFICATION-INDUCED INCREASE IN THE PERIODIC ACID-SCHIFF REACTION IN THE GASTROINTESTINAL TRACT: MECHANISM AND DISTRIBUTION OF THE REACTIVE SUBSTANCE. *(E.)* Reid, P. E.; Culling, C. F. A.; Dunn, W. L. (Fac. Med., Univ. British Columbia, Vancouver, Canada). *J. Histochem. Cytochem.* 21(5):473-482, 1973.

3967 IDENTIFICATION OF PEROXISOMES IN THE EPITHELIAL CELLS OF THE SMALL INTESTINE OF THE GUINEA PIG. *(E.)* Connock, M. J.; Kirk, P. R. (Dept. Biol. Sci., Polytechnic, Wolverhampton, England). *J. Histochem. Cytochem.* 21(5):502-503, 1973.

3968 DIAMINOBENZIDINE REACTION IN MITOCHONDRIA OF RAT STOMACH AND LIVER AS REVEALED BY ELECTRON MICROSCOPY. *(E.)* Sugihara, R. (Dept. Anat., Nara Med. Univ., Kashihara City, Japan). *Lab. Invest.* 28(5):554-564, 1973.

3969 CYTOLOGICAL STUDIES OF FAT-STORING CELLS IN THE LIVER OF RATS GIVEN LARGE DOSES OF VITAMIN A. *(E.)* Kobayashi, K.; Takahashi, Y.; Shibasaki, S. (Gumma Univ. Sch. Med., Maebashi, Japan). *Nature (New Biol.).* 243(127):186-188, 1973.

3970 GASTRIC LESIONS IN RATS AFTER THE FEEDING OF SULPHITE. *(E.)* Feron, V. J.; Wensvoort, P. (Central Inst. Nutr. Food Res., TNO, Zeist, Netherlands). *Pathol. Eur.* 7(2):103-111, 1972.

3971 ANATOMICAL AND PHYSIOLOGICAL CHARACTERISTICS OF THE ETAT MEMMELONNE: A NORMAL VARIANT OF THE GASTRIC MUCOSA. *(E.)* Stone, D. D.; Keats, T. E. (Univ. Virginia Sch. Med., Charlottesville). *Radiology* 107(3):537-538, 1973.

3972 ADRENERGIC CONTRIBUTION OF THE ABDOMINAL VAGUS NERVES IN THE CAT. *(E.)* Liedberg, G.; Nielsen, K. C.; Owman, C.; Sjoberg, N. O. (Dept. Histol., Univ. Lund, Sweden). *Scand. J. Gastroenterol.* 8(2):177-180, 1973.

3973 HISTOCHEMICAL AND ULTRASTRUCTURAL INVESTIGATION ON THE ENDOCRINE CELLS OF THE STOMACH IN HYPERSECRETING (PYLORUS-LIGATED) RATS. *(E.)* Bussolati, G.; Monga, G. (Fac. Med. Surg., Univ. Turin, Italy). *Virchows Arch. (Zellpathol.)* 13(1):55-67, 1973.

3974 VARIATIONS IN CRYPT CELL CYCLE TIME AND MITOTIC TIME IN THE SMALL INTESTINE OF THE RAT. *(E.)* Tutton, P. J. M. (Dept. Anat., Monash Univ., Clayton, Australia). *Virchows Arch. (Zellpathol.)* 13(1):68-78, 1973.

See also, 4015, 4037, 4132, 4165, 4166, 4167, 4650.

3975 INTESTINAL ABSORPTION USING VIBRATION-OBTAINED INDIVIDUAL SMALL BOWEL EPITHELIAL CELLS OF THE RAT: FOLATE ABSORPTION. *(E.)* Momtazi, S.; Herbert, V. (VA Hosp., Bronx, N.Y.). *Am. J. Clin. Nutr.* 26(1):23-29, 1973.

Suspensions of individual rat (Charles River strain) small bowel epithelial cells were obtained by a vibration method and used for *in vitro* study of factors affecting ^{3}H-pteroylglutamic acid (^{3}HPGA) uptake. Each incubation flask contained approximately 10^6 cells. Quantity of ^{3}H-pteroylglutamic acid in each flask ranged from 0.28 to 25 ng. Uptake was pH-dependent, being lowest at pH 6.6-6.8 and greatest at pH 4-5 and 7.1-7.6. The percentage uptake remained essentially unchanged as the concentration of ^{3}H-pteroylglutamic acid in the medium increased over 57-fold. Uptake was markedly enhanced by glucose in cells from the upper but not from the lower half of the small bowel. Much more ^{3}H-pteroylglutamic acid was taken up by individual cells from the upper than from the lower half of the small bowel. Uptake was reduced by 75 mg/ml diphenylhydantoin; this effect was more striking in the presence than in the absence of glucose. These results suggest that intestinal cells obtained by vibration may be used to rapidly provide information about factors affecting absorption. These findings can later be tested by more elaborate methods.

3976 EFFECTS OF ALCOHOL ON ACTIVE TRANSPORT IN THE RAT STOMACH. *(E.)* Shanbour, L. L.; Miller, J.; Chowdhury, T. K. (Univ. Texas Med. Sch., Houston). *Am. J. Dig. Dis.* 18(4):311-316, 1973.

The topical application of 20% ethanol in 150 mN NaCl to rat gastric mucosa *in vivo* produced an immediate but transient drop in transmucosal electrical potential (-28±4 to -22±4 mV at 30 min after treatment). Reapplication again depressed transmucosal potential, but the recovery time was longer. When ethanol was present in an acid solution (50 mN NaCl + 100 mN HCl), the changes in transmucosal potential difference became more marked (-22±2 to -12±2 mV). The electrical potentials at their lowest values were then correlated with luminal Na^+, K^+, H^+, and Cl^- concentrations. Changes in luminal volume and concentrations of Na^+, K^+, and H^+ 5 min after ethanol application were negligible. However, the Cl^- concentration decreased significantly when the electrical potential fell to minimal values. These data indicate that one of the earliest effects of ethanol on the rat stomach is depression of gastric mucosal potential, which correlates with Cl^- movement. Measurements of electrical resistance by an *in vivo* short-circuit current technic suggest that ethanol acts by inhibiting active transport processes.

3977 INTESTINAL CALCIUM ABSORPTION, Ca-BINDING PROTEIN, AND Ca-ATPase IN DIPHOSPHONATE-TREATED RATS. *(E.)* Bonjour, J. P.; Russell, R. G. G.; Morgan, D. B.; Fleisch, H. A. (Dept. Pathophysiol., Univ. Bern, Switzerland). *Am. J. Physiol.* 224(5):1011-1017, 1972.

Calcium transport in the small intestine was studied in male and female Wistar rats whose bone mineralization was inhibited by disodium-ethane-1-hydroxy-1,1-diphosphonate (EHDP; 10 mg P/kg/day for 7 days). Perfusion of the intestine *in vivo* revealed a decrease in the net calcium absorption rate particularly in the duodenum in EHDP-treated rats. This reduction in net calcium absorption was not associated with an increase in calcium secretion indicating that only the flux of calcium from lumen to blood was unchanged by EHDP. Large doses of vitamin D_3 (2,000 IU/day for 7 days) completely prevented the EHDP-induced reduction in duodenal calcium absorption because of the formation of 1,25-dihydroxycholecalciferol, the most active metabolite for stimulating calcium absorption. The calcium-binding protein content of the duodenal mucosa, as well as duodenal brush-border enzyme activities due to Ca^{++}-ATPase and alkaline phosphatase, were also decreased in EHDP-treated animals. The Mg^{++}-ATPase and sucrase activities remained unchanged. The decrease in intestinal calcium absorption that occurs when bone mineralization is inhibited by EHDP suggests the existence of a specific biological mechanism that adjusts intestinal calcium absorption to the calcium requirements of the bone. The low calcium absorption observed in EHDP-treated rats may represent an adaptation in response to a sudden decrease in the calcium requirement of the organism resulting from the inability of the bone to utilize calcium.

3978 ANGIOTENSIN, VASOPRESSIN, AND CYCLIC AMP: EFFECTS ON SODIUM AND WATER FLUXES IN RAT COLON. *(E.)* Hornych, A.; Meyer, P.; Milliez, P. (Broussais Hosp., Paris, France). *Am. J. Physiol.* 224(5):1223-1229, 1973.

Everted sacs of colonic mucosa from male Spargue-Dawley rats were studied *in vitro* to determine the effects of angiotensin II and cyclic AMP on net fluxes of sodium and water. Angiotensin (10^{-12}M to 10^{-11}M) increased the net transfer of sodium by 27% and water by 39% in ascending colon of normal rats. The maximal stimulatory effect occurred at 5 x 10^{-11}M in descending colons of normal rats; the mean inhibitory effect was 40%. Angiotensin inhibited the net transfer. In colons from nephrectomized and adrenalectomized rats, angiotensin had a biphasic effect on both ascending and descending segments: a stimulatory effect occurred at 10^{-12}M and 10^{-11}M, while concentrations of 10^{-6} and 10^{-5}M had an inhibitory effect. Vasopressin (10^{-9}M) and cyclic AMP also increased sodium and water transfer in ascending colons of normal rats. A possible mediatory role of cyclic AMP in the response to angiotensin and vasopressin is suggested. Theophylline and imidazole (both at 10^{-3}M) did not modify net fluxes of water and sodium in ascending colon. Theophylline inhibited angiotensin and vasopressin effects in ascending colon. Imidazole inhibited the angiotensin effect. Ouabain (7 x 10^{-3}M) profoundly depressed the sodium gradient so that while transport of fluid still occurred, the hypertonic nature of this transport had disappeared. It is concluded that angiotensin has a direct effect on sodium and water transport in rat colonic mucosa. This effect is apparent at physiological concentrations of the peptide which are lower than those necessary for smooth muscle contraction or other biological actions. These results suggest that a major role of angiotensin is to act directly on electrolyte transport.

3979 SUGAR TRANSPORT AT THE BASAL AND LATERAL ASPECT OF THE SMALL INTESTINAL CELL. *(E.)*

Bihler, I.; Cybulsky, R. (Fac. Med., Univ. Manitoba, Winnipeg, Canada). *Biochim. Biophys. Acta* 298(2): 429-436, 1973.

A method has been developed for the study of sugar transport at the basal and lateral aspect of epithelial cells from mouse small intestine in isolation from the active, Na^+-dependent transport system located in the luminal aspect. Everted small intestine was treated with 3 mM $HgCl_2$ to irreversibly inhibit active sugar transport at the luminal aspect of the cells. These cells were then isolated and suspended by vibrating at 60 Hertz for 20 min. Although sugar transport across the luminal aspect of the cells was blocked, maintenance of normal levels of internal Na^+ and K^+ indicates that the cells suffered no other functional damage. Sugar transport across the basal and lateral aspects of these epithelial cells was independent of Na^+ and insensitive to phlorizin. In contrast to its behavior at the luminal aspect, α-methyl-D-glucoside did not compete with D-glucose and 3-O-methyl-D-glucose transport at the basal aspect of epithelial cells. 2-Deoxy-D-glucose, D-fructose, and D-mannose did compete with D-glucose and 3-O-methyl-D-glucose transport at the basal aspect of small intestine epithelial cells.

3980 STUDIES ON THE MECHANISM OF ACTIVE INTESTINAL TRANSPORT OF GLUCOSE. *(E.)*

Swaminathan, N.; Eichholz, A. (Rutgers Med. Sch., New Brunswick, N.J.). *Biochim. Biophys. Acta* 298(3):724-731, 1973.

D-[2-^{3}H]Glucose is actively accumulated by hamster intestinal rings and everted sacs. Isolated glucose from the tissue and serosal fluid showed no significant change in specific activity. These data rule out an active transport mechanism involving a covalent bond with the oxygen of the hydroxyl on C-2 of glucose. At the same time an exchange reaction of the ^{3}H with water catalyzed by brush borders has been observed. This reaction is not catalyzed by phosphohexoisomerase or hexokinase. Addition of ATP had no effect. This system was distinguished from that of the transport carrier by the low K_m and inhibition by 2-deoxyglucose and mannose. If this reaction were mandatory for transport, the accumulated glucose should have a lower specific activity. This reaction is probably independent of glucose transport.

3981 INTESTINAL ABSORPTION OF CHOLINE IN THE CHICK. *(E.)*

Herzberg, G. R.; Lerner, J. (Dept. Biochem., Univ. Maine, Orono). *Biochim. Biophys. Acta* 307(1):234-242, 1973.

The intestinal absorption of choline in the chick has been studied *in vitro* in 1-min incubations using a tissue-accumulation method. There are two processes involved in choline absorption: a mediated route with a apparent K_m of 110 μM and a maximum velocity V of 25 nmol/ml tissue water/min and a diffusion mechanism. Since 2 mM hemicholinium abolishes the mediated component and the system shows diffusion kinetics over the entire concentration range, the hypothesis of 2 absorption processes is supported. Lowering the external Na^+ concentration leads to an increase in apparent K_m but causes no change in V. Mediated choline entry is not sensitive to anaerobiosis, ouabain (0.5 mM), or oligomycin (10 μg/ml). The transport of choline can be competitively inhibited by structural analogues. Total inhibition was caused by hemicholinium-3 (5 mM) and N,N-dimethylethanolamine (5 mM) which also cause trans-inhibition. Choline influx, however, is independent of intracellular Na^+ concentration. Although the transports of choline and thiamine are mutually antagonistic, results of a kinetic test indicate that there probably is not a single common site for choline and thiamine absorption.

3982 INTESTINAL ABSORPTION DURING HYPOVOLEMIC SHOCK. *(E.)*

Fromm, D. (Water Reed Army Med. Ctr., Washington, D. C.). *Ann. Surg.* 177(4): 448-452, 1973.

The effects of 90 min of nonreservoir hypovolemic shock on intestinal absorption of electrolytes and water *in vivo* were determined on rabbits bled 20-25% of their estimated blood volume (8% of body weight). The transmural electrical potential difference was determined for an isolated segment of terminal ileum, which was perfused with a bicarbonate-Ringer's solution containing a volume marker. The spontaneous potential difference, absorption of Na^+, K^-, $Cl^-$and water and secretion of HCO_3^- did not change significantly over a 2 hr period in control rabbits. During shock, however, the potential difference increased by 50%; Na^+ absorption increased by 60% and water absorption, by 68%. The rates of K^+ and Cl^- absorption did not change significantly. Na^+ was absorbed against both its concentration and increased electrical gradient during shock, which suggests involvement of an active ion transport process. Oxygen consumption *in vitro* of ileal mucosa from shocked rabbits increased by 46% and is consistent with an increase in active ion transport.

3983 INTESTINAL ABSORPTION OF COPPER AND ZINC AFTER DIETARY DEPLETION. *(E.)*

Kirchgessner, M.; Schwarz, F. J.; Grassmann, E. (Inst. Anim. Nutr., Munich Tech. Univ., Freising-

Weihenstephan, Germany). *Bioinorg. Chem.* 2(3): 255-262, 1973.

Sprague-Dawley rats received diets containing 1 μg Cu/g (deficient) or 50 μM Cu/kg (control) as the sulfate, fumarate, leucine complex, or ethylenediamine tetraacetate complex for 3-7 weeks before they were sacrificed. Everted jejunal sacs from these animals were incubated in a mucosal Tyrode solution (pH 5.5) containing 10^{-4} M/liter Cu as the sulfate or glycine complex. The serosal solution consisted of pH 7.0 Tyrode solution. Transfer of Cu from the mucosal to serosal solution was increased by about 80% in intestinal sacs from rats fed Cu-deficient diets when $CuSO_4$ was added to the mucosal solution and by about 50% when the Cu-glycine complex was added. There was no difference between groups fed the various Cu supplements. Intestinal uptake of Cu was also significantly greater in Cu-deficient rats when $CuSO_4$ was added the mucosal solution but no difference between deficient and control rats was found when the Cu-glycine complex was added to the mucosal solution. These results suggest that Cu is first bound to the intestinal wall and then transported. The failure to find an increase in Cu uptake by intestine from deficient rats when the Cu-glycine complex was added to mucosal solution may be due to the effect of the ligand on binding of Cu to the intestinal wall. Both the intestinal uptake of Zn and transfer of Zn from the mucosal to serosal solution were significantly increased in everted jejunal sacs from rats fed Zn-deficient (2 μg Zn/g) diets than in those from rats fed Zn-supplemented (25 μg Zn/g *ad libitum* or pair-fed) diets when $ZnSO_4$ (10^{-4}M/liter) was added to the mucosal solution.

3984 MECHANISMS OF IRON ABSORPTION AND TRANSPORT IN NEONATAL RAT INTESTINE. *(E.)*

Gallagher, N. D.; Mason, R.; Foley, K. E. (Repatriation Gen Hosp., Concord, Australia). *Gastroenterology* 64(3):438-444, 1973.

The absorption of a dose of ferrous (^{59}Fe) sulfate (100 μg p.o.) occurs throughout the entire small intestine of the newborn rat. ^{59}Fe absorption and transport across the duodenum and jejunum resembled processes which occur in adult iron-deficient animals. Prevention of the ileal uptake of ^{59}Fe by prior treatment with cortisone (0.1 mg/kg s.c.) did not influence net iron transport so that ^{59}Fe absorbed by the ileum was transported across the intestine in very small quantities. When large doses (100-360 μg) of iron were fed, the ileum was an important site of iron absorption in newborn animals, but it was relatively unimportant in weaned animals. The decreases in ^{59}Fe absorption at weaning is attributed in part to the transition of the ileal epithelium from a pinocytotic to an adult type. Although ileal epithelium in newborns was of little importance in the transport of a dose of ferrous iron, tracer quantities of ^{59}Fe fed in the form of transferrin were selectively taken up by this region.

3985 PERMEABILITY OF GASTRIC MUCOSA TO HYDROGEN AND LITHIUM. *(E.)*

Chung, R. S. K.; Field, M.; Silen, W. (Harvard Med. Sch., Boston, Mass.). *Gastroenterology* 64(4):593-598, 1973.

At varying luminal concentrations of Li^+ and in the presence of agents known to increase gastric mucosal permeability, net flux of Li^+ from Heidenhain pouches of antrectomized dogs was determined. Net Li^+ flux was linear with concentrations of 0.5 to 50 mM. Clearances from the gastric lumen for Li^+ and H^+, k_{Li} and k_H, defined as flux/concentration, were determined under basal conditions and in the presence of 20 mM acetylsalicylic acid or 40 mM Na taurocholate (solutions contained 2.5 mM Li^+ and 120 mM H^+). Both acetylsalicylic acid and taurocholate increased k_{Li} and k_H 3-fold, but the ratio $k_{Li}:k_H$ remained unchanged. k_{Li} was also measured when 10 mM ethylenediaminetetraacetic acid (pH 8.5) or 15% ethanol were instilled. Marked increases of k_{Li} were seen in both cases. With ethanol, net H^+ secretion also developed. Both Li^+ and H^+ appear, therefore, to diffuse out of the gastric lumen by the same pathway. Factors which alter permeability of the mucosa to one of the cations cause a proportional change in permeability to the other. It is concluded that the movement of Li^+ across the gastric mucosa occurs in a constant relation to the diffusion of H^+ and that determining k_{Li} is a useful indirect measure of mucosal permeability to H^+

3986 STUDIES ON THE MECHANISM OF ACTION OF ANGIOTENSIN ON FLUID TRANSPORT BY THE MUCOSA OF RAT DISTAL COLON. *(E.)*

Davies, N. T.; Munday, K. A.; Parsons, B. J. (Dept. Physiol. Biochem., Univ. Southampton, England). *J. Endocrinol.* 53(3):483-492, 1972.

A study was made of the effects of cyclic AMP (5 mM), theophylline (10 mM), cycloheximide (2 μg/ml), puromycin (30 μg/ml), and actinomycin D (2 μg/ml) on the stimulation by angiotensin (1 x 10^{-11} g/ml) of fluid transport by sacs of male albino Wistar rat colon mucosa. Cyclic AMP and theophylline, added together or separately, had no effect on fluid transport by colon sacs, suggesting that stimulation of fluid transport after angiotensin application is not mediated through cyclic AMP. Cycloheximide and puromycin (in concentrations which block colon protein synthesis by 50-90%) had no effect on fluid transport by control colon sacs, but completely blocked the stimulatory response of the colon to angiotensin. In contrast, actinomycin D (at a concentration which significantly inhibits RNA synthesis) did not affect fluid transport in control or angiotensin-stimulated colon sacs. These observations suggest that angiotensin stimulation of colon fluid transport is secondary to an effect on ribosomal protein synthesis, resulting in the translation of preformed RNA to yield protein associated with the fluid transport process.

3987 THE CONTRIBUTION OF THE COLON TO ELEC-

TROLYTE AND WATER CONSERVATION IN MAN. *(E.)* Phillips, S. F.; Giller, J. (Mayo Clin., Rochester, Minn.). *J. Lab. Clin. Med.* 81(5): 733-746, 1973.

The compositions of terminal ileal contents and feces were compared in 5 healthy volunteers and in 2 patients with diarrhea. One patient, a 53-yr-old woman, was originally diagnosed as having nontropical sprue. Autopsy revealed a normal colon but diffuse ulcerative jejunoileitis. The second patient, a 43-yr-old woman, had resection of the terminal 75 cm of ileum and 10 cm of cecum due to intestinal ischemia caused by occlusion of a ventral hernia. Continous sampling of the ileum was done during the slow infusion of a nonabsorbable marker under standard dietary conditions. Colonic inflow, fecal output, and colonic absorption were quantified. With a standard diet in healthy subjects, 1,500 ml of water, 200 mEq of sodium, 100 mEq of chloride, 10 mEq of potassium, 15 mEq of calcium, and 9 mEq of magnesium entered the colon each day. This is more than had previously been assumed. Fecal excretion of water, sodium, chloride, and potassium was small, and the colon absorbed more than 95% of the sodium, chloride, and water and 50% of the potassium traversing the ileocecal region. Small values for mean absorption of magnesium and secretion of calcium by the colon were also found. In the patient with severe nontropical sprue in relapse, colonic inflow was more than twice that in healthy subjects and, despite colonic reabsorption of 3,000 ml of water and electrolytes each day, severe diarrhea was present. In the patient with ileal resection and severe diarrhea, which was corrected by cholestyramine administration, excessive fecal volume was caused in part by colonic dysfunction. In two healthy subjects, the volume and the electrolyte content of the proximal ileum were approximately 50% greater than those of the terminal ileum. This study demonstrates that relatively minor impairments of large bowel function can significantly increase fecal water and electrolyte loss.

3988 THE INFLUENCE OF EXOGENOUS STEROIDS ON MACROMOLECULE UPTAKE BY THE SMALL INTESTINE OF THE NEW-BORN RAT.

(E.) Daniels, V. G.; Hardy, R. N.; Malinowska, K. W.; Nathanielsz, P. W. (Physiol. Lab., Cambridge, England). *J. Physiol. (Lond.)* 229(3):681-695, 1973.

Plasma concentrations of cortisol and corticosterone, measured by competitive protein binding in rats 5-28 days after birth, have been related to the intestinal uptake of ^{125}I polyvinyl pyrrolidone (PVP). The plasma cortisol concentration was consistently low throughout the period studied, not exceeding 1 µg/100 ml. There was 2-fold increase in the plasma corticosterone concentration at 18-21 days, when the PVP uptake declined to zero. This was previously shown to coincide with cessation of the transfer of maternal antibodies from the intestine into the circulation (closure). Injection of a large dose of cortisone acetate (5 mg) 5 days after birth resulted in precocious closure; PVP uptake declined to two-thirds of the control value in 24 hr and fell progressively to zero in 6 days. Injection of this steroid at age 12 days caused closure in 4 days. Precocious closure induced by cortisone acetate was closely comparable histologically with natural closure; the decline in PVP uptake was associated with the progressive displacement of vacuolated cells from the villi of the terminal intestine. Injection of corticosterone at either 5 (2.5 mg) or 12 (5 mg) days after birth also reduced PVP uptake. However, the reduction was transient and uptake returned to control levels some days after the injection. This temporary reduction in PVP uptake was not associated with any histological change in the small intestine at the light microscope level. The injection of either cortisone acetate or corticosterone caused impaired body growth and a reduction of adrenal weight in animals injected at 12 days but not in animals injected at 5 days.

3989 THE EFFECT OF ADRENALECTOMY OR PHARMACOLOGICAL INHIBITION OF ADRENOCORTICAL FUNCTION ON MACROMOLECULE UPTAKE BY THE NEW-BORN RAT INTESTINE.

(E.) Daniels, V. G.; Hardy, R. N.; Malinowska, K. W. (Physiol. Lab., Univ. Cambridge, England). *J. Physiol. (Lond.)* 229(5):697-707, 1973.

Bilateral adrenalectomy in 18-day-old rats prolonged by about 4 days the period during which villous epithelial cells in the small intestine took up polyvinyl pyrrolidone (PVP) of mean molecular weight 160,000. The eventual termination of PVP uptake (closure) closely resembled that in control animals: the time course of the decline in uptake and histological changes indicated that more mature PVP-impermeable cells progressively ascended the villi. Bilateral adrenalectomy after closure had no effect on subsequent uptake of PVP. Injection of 1.25 mg/day metyrapone had no effect in rats 10 days after birth, but an injection of 2.5 mg/day after day 13 caused closure within 3 days. At age 19 days the mean uptake of PVP by controls was 35%, whereas metyrapone-treated rats of the same age absorbed only 8%. Between age 18-21 days metyrapone injection reduced plasma corticosterone by more than 60% and increased plasma deoxycorticosterone 7-fold. Injection of aminoglutethimide (10 mg/day) also caused early closure and had an effect similar to that of metyrapone on plasma corticosterone and deoxycorticosterone. Metyrapone or aminoglutethimide injection increased the relative adrenal weight compared with controls. Aminoglutethimide was the more effective and increased relative adrenal weight by about 100%, while metyrapone caused a 14-20% increase. These findings rule out the possibility that hormones from the adrenal cortex and ACTH trigger closure. Early closure induced by metyrapone and aminoglutethimide may have been due to the large increase in plasma deoxycorticosterone which has previously been shown to induce precocious closure. However, this is unlikely in normal animals since plasma deoxycorticosterone concentrations remained low and constant during closure in the controls.

3990 SOLVENT DRAG INFLUENCE ON THE INTESTINAL ABSORPTION OF BASIC DRUGS.

(E.) Ochsenfahrt, H.; Winne, D. (Pharmacol. Inst., Univ. Tubingen, Germany). *Life Sci.* [1] 11(1):1115-1122, 1972.

Jejunal loops in anaesthetized male Wistar rats were perfused with hypotonic, isotonic, and hypertonic buffered saline solutions containing 759 μM ^{14}C-labeled aminopyrine or 117 μM antipyrine. The blood flow in the loop was maintained constant at an intermediate level (0.7-0.9 ml/min/g wet weight). A positive water net flux (towards the blood) enhanced the drug absorption rate by 44-49%. A negative water net flux (towards the lumen) diminished the drug absorption rate by 35-39%. The rate of disappearance from the gut lumen was equal to the appearance rates. Analysis shows that the water net flux influences the absorption of aminopyrine and antipyrine only by interaction between water and drug molecules within the epithelial membranes. Blood flow changes in the capillaries near the epithelium induced by water net flux play no role in the absorption of these drugs. The high sieving coefficient Φ, which measures interaction between solvent and solute molecules during epithelial membrane transfer, indicates that water and lipophilic drug molecules interact within the lipid part of the cell membrane.

3991 EXCHANGE TRANSPORT BETWEEN VARIOUS AMINO ACIDS AND ALANINE IN ISOLATED INTESTINAL EPITHELIAL CELLS.

(E.) Reiser, S.; Christiansen, P. A. (Indiana Univ. Sch. Med., Indianapolis). *Life Sci.* [II] 12(2):25-33, 1973.

Exchange transport between various amino acids and alanine was investigated in epithelial cells isolated from male Wistar rat intestine. In cells preloaded with alanine (average intracellular concentration 5.1 mM) the uptake of 1 mM neutral amino acids increased 6% (tryptophan) to 36% (alanine) and the uptake of 1 mM basic amino acids increased 80% (arginine) to 102% (ornithine) as compared to control cells. The magnitude of these increases was at least as great when the studies were performed in a Na$^+$-free medium. Extracellular lysine accelerated the movement of alanine out of alanine-preloaded cells, but extracellular alanine had no effect on the movement of lysine out of lysine-preloaded cells. The presence of 1 mM alanine in the incubation media inhibited the uptake of 1 mM neutral amino acids by 20-30%, but increased the uptake of 1 mM basic amino acids by 47-81%. These results indicate the presence of two distinct alanine-amino acid exchange transport pathways: (1) a comparatively low level competitive exchange with neutral amino acids mediated by the neutral amino acid transport pathway, and (2) a strongly accelerating heteroexchange with basic amino acids mediated by at least two different transport pathways.

3992 ROLE OF LUMINAL LECITHIN IN INTESTINAL FAT ABSORPTION.

(E.) O'Doherty, P. J. A.; Kakis, G.; Kuksis, A. (Dept. Biochem., Univ. Toronto, Canada). *Lipids* 8(5):249-255, 1973.

The effect of biliary lecithin on fat absorption was studied in male Wistar rats 1 day after production of a fistula in the bile duct. These rats were fed micellar solutions of bile salt, monoglyceride, and radioactively labeled free fatty acids. By electron microscopy and measurement of uptake of radioactivity into liver and adipose tissue, it was shown that there was significant impairment of fat clearance from intestinal mucosa in the absence of bile lecithin. Fat clearance was effected by the feeding of phosphatidyl choline or choline, but not phosphatidyl ethanolamine, inositol, or cholesterol. In the absence of luminal choline there was a decrease in incorporation of radioactive leucine into mucosal protein. Biliary and dietary lecithin or choline must therefore play an important role in triglyceride transport out of intestinal mucosa, by providing surfactant lecithin for the chylomicron envelope and by supporting mucosal protein biosynthesis. The mechanism by which biliary lecithin aids formation and release of chylomicrons and the nature of its involvement in the synthesis of chylomicron protein is unknown.

3993 EFFECT OF INTRAVENOUS PROSTAGLANDIN $F_{2\alpha}$ ON SMALL INTESTINAL FUNCTION IN MAN.

(E.) Cummings, J. H.; Newman, A.; Misiewicz, J. J.; Milton-Thompson, G. J.; Billings, J. A. (Central Middlesex Hosp., London, England). *Nature (Lond.)* 243(5403):169-171, 1973.

Intestinal movements of water and electrolytes in response to injections of prostaglandin $F_{2\alpha}$ (0.28-0.86 μg/kg/min i.v.) were measured in 6 healthy male subjects with a continuous steady state perfusion technique. At the largest doses (0.81-0.86 μg/kg/min) jejunal net secretion of water, sodium, and chloride into the lumen occurred along with a marked decrease in segmental pressure waves. Doses of 0.65-0.86 μg/kg/min caused net secretion of water, sodium, and chloride into the lumen in the ileum along with profoundly diminished pressure activity. Side effects consisted of mild abdominal colic in 8 subjects, suggesting the colon may also respond to infused prostaglandin. These results demonstrate that i.v. administration of prostaglandin $F_{2\alpha}$ profoundly affects water and electrolyte transport and the motor function of the small intestine. It is uncertain which of these is more important in causing diarrhea.

3994 INHIBITION OF INTESTINAL CALCIUM TRANSPORT BY DIPHENYLHYDANTOIN IN RAT DUODENUM.

(E.) Caspary, W. F. (Med. Clin., Univ. Gottingen, Germany). *Naunyn-Schmiedebergs Arch. Pharmacol.* 274(2):146-153, 1972.

Diphenylhydantoin pretreatment of male Wistar rats for 20 days caused a reversible inhibition (48%) of duodenal calcium accumulation *in vitro* without affecting calcium-binding protein activity in the supernatant of duodenal homogenates. No inhibition could be demonstrated 20 days after discontinuation of the treatment. Active transport of hexoses and amino acids was not altered after diphenylhydantoin pretreatment. Increases in hexose-induced transmural potential differences were the same in controls and diphenylhydantoin-pretreated rats. The calcium-binding protein activity was the same in homogenates of duodenal mucosa from rats treated with diphenylhydantoin and those from controls. Inhibition of intestinal calcium transport may be responsible for the biochemical abnormalities underlying osteomalacia in patients on anticonvulsant therapy.

3995 EFFECT OF INHIBITORS OF SODIUM-INDEPENDENT LYSINE TRANSPORT IN INTACT INTESTINE. *(E.)* Frederick, P. K.; Reiser, S.; Christiansen, P. A. (Indiana Univ. Sch. Med., Indianapolis). *Proc. Soc. Exp. Biol. Med.* 142(3):988-992, 1973.

A comparison was made of the effect of various inhibitors on the sodium-independent intracellular accumulation of 1 mM lysine and the sodium-independent stimulation of 1 mM lysine transmural transport by intracellular leucine in intact intestine from male Wistar rats. Ethacrynic acid (5 mM), sodium fluoride (1 mM), and probenecid (5 mM) did not inhibit either of these sodium-independent lysine transport systems while dinitrophenol (0.1 mM) and ATP (5 mM) inhibited both. N-Ethylmaleimide (0.4 mM) decreased lysine intracellular accumulation but not leucine-stimulated lysine transport. The action of the inhibitors on these two sodium-independent lysine transport systems appears generally similar, therefore supporting the hypothesis that sodium-independent lysine transport may be mediated by an exchange transport.

3996 PLASMA PROTEIN ESCAPE FROM THE INTESTINAL CIRCULATION TO THE LYMPHATICS DURING FAT ABSORPTION. *(E.)* Wollin, A.; Jaques, L. B. (Coll. Med., Univ. Saskatchewan, Saskatoon, Canada). *Proc. Soc. Exp. Biol. Med.* 142(4):1114-1117, 1973.

During experiments in which Evans blue (10 mg/kg i.v.) was injected into rats receiving olive oil (2 ml/kg) or an equivalent volume of glucose solution (0.5 g/ml) by stomach tube, an escape of plasma proteins labeled with Evans blue was observed in the duodenum and jejunum. Lymph was collected from an intestinal fistula and the rate of protein escape from the circulation measured by the appearance of Evans blue. The dye was, for the most part, bound to plasma albumin and not free. During feeding of olive oil the amount of Evans blue collected was at least 3 times higher than when rats received glucose solution. Results suggest that olive oil absorption causes a local vascular change, allowing increased escape of plasma proteins. Whether this results from an increased capillary permeability, a shunting of the blood flow to an exchange capillary network, or endothelial vesicular transport is not clear.

3997 IRON TRANSPORT BY RAT SMALL INTESTINE IN VITRO: EFFECT OF BODY IRON STATUS. *(E.)* Howard, J.; Jacobs, A. (Welsh Natl. Sch. Med., Cardiff). *Br. J. Haematol.* 23(5):595-603, 1972.

3998 USE OF THE DOUBLE THIRY-VELLA LOOP IN THE STUDY OF THE EFFECTS OF PANTOTHENIC ACID ON INTESTINAL ABSORPTION OF GLUCOSE. *(E.)* Huan, P. H.; Hung, L. V. (Fac. Sci., Sorbonne, Paris, France). *Br. J. Nutr.* 28:405-408, 1972.

3999 EFFECT OF CHRONIC DRUG TREATMENT ON INTESTINAL MEMBRANE TRANSPORT OF ^{14}C-L-DOPA. *(E.)* Rivera-Calimlim, L. (Univ. Rochester, Sch. Med. Dentistry, N.Y.). *Br. J. Pharm.* 46(4):708-713, 1972.

4000 NEONATAL ADRENOCORTICAL FUNCTION AND ITS POSSIBLE RELATION TO THE UPTAKE OF MACROMOLECULES BY THE SMALL INTESTINE OF THE GUINEA-PIG AND RABBIT. *(E.)* Malinowska, K. W.; Hardy, R. N.; Nathanielsz, P. W. (Physiol. Lab., Univ. Cambridge, England). *J. Endocrinol.* 55(2):397-404, 1972.

4001 UPTAKE OF CALCIUM AND MAGNESIUM BY RAT DUODENAL MUCOSA ANALYSED BY MEANS OF COMPETING METALS. *(E.)* O'Donnell, J. M.; Smith, M. W. (A. R. C. Inst. Anim. Physiol., Babraham, Cambridge, England). *J. Physiol. (Lond.)* 229(3):733-749, 1973.

4002 GASTROINTESTINAL ABSORPTION AND ANTI-INFLAMMATORY EFFECT OF BROMELAIN. *(E.)* Izaka, K. I.; Yamada, M.; Kawano, T.; Suyama, T. (Green Cross Corp., Osaka, Japan). *Jap. J. Pharmacol.* 22(4):519-534, 1972.

4003 COLCHICINE, CYCLOHEXIMIDE AND SEROTONIN INHIBITION OF INTESTINAL FLUID PRODUCTION CAUSED BY VIBRIO CHOLERA TOXIN. *(E.)* Strombeck, D. R. (Univ. Illinois Med. Ctr., Chicago). *Life Sci. (I)* 12(5):211-218, 1973.

4004 ACTIVE TRANSPORT OF L-DOPA IN THE INTESTINE. *(E.)* Wade, D. N.; Mearrick, P. T.; Morris, J. L. (St. Vincent's Hosp., Sydney, Australia). *Nature (Lond.)* 242(5398):463-465, 1973.

4005 THE INFLUENCE OF BLOOD FLOW IN THE ABSORPTION OF L- AND D-PHENYLALANINE FROM THE JEJUNUM OF THE RAT. *(E.)* Winne, D. (Pharmacol. Inst., Univ. Tubingen, Germany). *Naunyn-Schmiedebergs Arch. Pharmacol.* 277(2):113-138, 1973.

4006 ELECTROLYTE MOVEMENT ACROSS GASTRIC MUCOSA OF TOTAL ISOLATED EX VIVO CANINE STOMACH. *(E.)* Kowalewski, K.; Scharf, R.; Schier, J. F.; Kolodej, A. (Inst. Hematol., Warsaw, Poland). *Rendic. Gastroenterol.* 4(3):126-133, 1972.

4007 DIGESTION OF FAT BY YOUNG PIGS: A STUDY OF THE AMOUNTS OF FATTY ACID IN THE DIGESTIVE TRACT USING A FAT-SOLUBLE INDICATOR OF ABSORPTION. *(E.)* Carlson, W. E.; Bayley, H. S. (Dept. Nutr., Univ. Guelph, Canada). *Br. J. Nutr.* 28:339-346, 1972.

4008 RETROGRADE INTRABILIARY INJECTION: ABSORPTION OF WATER AND OTHER COMPOUNDS FROM THE RAT BILIARY TREE. *(E.)* Peterson, R. E.; Fujimoto, J. M. (Med. Coll. Wisconsin, Milwaukee). *J. Pharmacol. Exp. Ther.* 185(1):150-162, 1973.

4009 ABSORPTION OF DIETHYLSTILBESTROL AND ITS GLUCURONIDE CONJUGATE FROM THE INTESTINES OF FIVE- AND TWENTY-FIVE-DAY-OLD RATS. *(E.)* Fischer, L. J.; Kent, T. H.; Weissinger, J. L. (Coll. Med., Univ. Iowa, Iowa City). *J. Pharmacol. Exp. Ther.* 185(1):163-170, 1973.

4010 MOVEMENT OF A POLYVINYLALCOHOL THROUGH THE DIGESTIVE TRACT AS A DIGESTION INDICATOR WITH SWINE. *(E.)* Ishikawa, S.; Sugimura, K. (Fac. Agric., Mie Univ., Tsu, Japan). *Agr. Biol. Chem.* 37(2):203-206, 1973.

4011 GASTROINTESTINAL ABSORPTION OF CERTAIN ANTICHOLINERGIC DRUGS. *(E.)* Beermann, B.; Hellstrom, K.; Rosen, A. (Serafimer Hosp., Stockholm, Sweden). *Eur. J. Clin. Pharmacol.* 5(2):87-92, 1972.

4012 BILE ACIDS AND VITAMIN A ABSORPTION IN MAN: THE EFFECTS OF TWO BILE-BINDING AGENTS, CHOLESTYRAMINE AND LIGNIN. *(E.)* Barnard, D. L.; Heaton, K. W. (Bristol Roy. Infirm., England). *Gut* 14(4):316-318, 1973.

4013 INTESTINAL ABSORPTION OF CALCIUM. *(E.)* Wills, M. R. (Roy. Free Hosp., London, England). *Lancet* (7807):820-823, 1973.

4014 THE INTESTINAL ABSORPTION OF GLUCOSE WITH THE SIMULTANEOUS DETERMINATION OF THE ARTERIOPORTAL GLUCOSE CONCENTRATION DIFFERENCE. *(E.)* Forster, H.; Meyer, E.; Ziege, M. (Inst. Vegetative Physiol., Univ. Frankfurt/Main, Germany). *Rev. Eur. Etud. Clin. Biol.* 17(10):958-964, 1972.

4015 ION TRANSPORT AND SURFACE ULTRASTRUCTURE IN THE NON-SECRETING STOMACH: EFFECT OF SOME WEAK ACIDS AND LARGE OSMOLALITY VARIATIONS. *(E.)* Frenning, B. (Biomed. Ctr., Univ. Uppsala, Sweden). *Upsala J. Med. Sci.* suppl. 13:1-19, 1972.

4016 Na^+ INFLUX AND INTRACELLULAR ION CONCENTRATIONS AS A FUNCTION OF MONOSACCHARIDE TRANSPORT THROUGH THE INTESTINAL MUCOSA. *(Ger.)* Remke, H.; Luppa, D.; Muller, F. (Inst. Physiol. Chem., Karl Marx Univ., Leipzig, Germany). *Acta Biol. Med. Germ.* 29(4/5):631-642, 1972.

4017 THE EFFECTS OF AMYTAL AND INACTIN ON ISOOSMOTIC NET FLUID TRANSPORT IN THE RABBIT GALL-BLADDER IN VITRO. *(E.)* Christensen, P.; Ostergaard Kristensen, L.; Leyssac, P. P. (Inst. Exp. Med., Univ. Copenhagen, Denmark). *Acta Physiol. Scand.* 87(4):455-464, 1973.

4018 A NEW INTESTINAL TUBE FOR STUDYING ABSORPTION. *(E.)* Chaudhuri, T. K.; Chaudhuri, T. K. (Univ. Iowa Hosp., Iowa City). *Am. J. Gastroenterol.* 59(4):315-320, 1973.

4019 EFFECT OF GLIBENCLAMIDE ON SUGAR TRANSPORT BY FED, STARVED AND DIABETIC RAT SMALL INTESTINE. *(E.)* Teale, J. D.; Love, A. H. G. (Dept. Med., Queen's Univ. Belfast, Northern Ireland). *Biochem. Pharmacol.* 22(9):997-1004, 1973.

4020 COUPLING BETWEEN Na^+ AND SUGAR TRANSPORT IN SMALL INTESTINE. *(E.)* Kimmich, G. A. (Univ. Rochester Sch. Med. Dentistry, N.Y.). *Biochim. Biophys. Acta* 300(1):31-78, 1973.

4021 INCREASED GLYCINE ABSORPTION RATE ASSOCIATED WITH ACUTE BACTERIAL INFECTIONS IN MAN. *(E.)* Cook, G. C. (Dept. Med., Univ. Zambia, Lusaka). *Br. J. Nutr.* 29(3):377-386, 1973.

4022 THE INFLUENCE OF WATER GRADIENTS AND OXYPHENISATIN ON THE NET TRANSFER OF SODIUM AND WATER IN THE RAT COLON. *(E.)* Nell, G.; Overhoff, H.; Forth, W.; Rummel, W. (Inst. Pharmacol. Toxicol., Univ. Saarland, Homburg, Germany). *Naunyn Schmiedebergs Arch. Pharmakol.* 277(4):363-372, 1973.

See also, 3928, 3929, 3931, 4050, 4078, 4095, 4108, 4125, 4206, 4530, 4576.

023 THYROCALCITONIN AND GASTROINTESTINAL PROPULSIVE MOTILITY. AN EXPERIMENTAL STUDY IN THE RAT. *(E.)* Segerstrom, A. (Univ. Hosp., Uppsala, Sweden). *Acta Chir. Scand.* 139(2):180-183, 1973.

The effect of thyrocalcitonin on gastrointestinal transit time was studied in rats by injection of 364 and 110 MRC milliU/100 g i.v. of thyrocalcitonin and intragastric administration of a test meal containing nonabsorbable $Na_2{}^{51}CrO_4$. Transit time was measured 30 min after thyrocalcitonin injection by planimetric analysis of the distribution of radioactivity. No significant difference in gastric retention or small bowel transit was found between controls and thyrocalcitonin-treated rats. Thus, the retarding effect of parathyroidectomy on gastrointestinal motility, primarily on gastric evacuation, nd the accelerating effect of parathyroid ormone must be due to changes in parathyroid ctivity. However, synergy between parathyroid ormone and thyrocalcitonin cannot be ruled out.

024 DUAL EFFECTS ON THE SPHINCTER OF ODDI AND GALLBLADDER INDUCED BY STIMULATION F THE RIGHT GREAT SPLANCHNIC NERVE. *(E.)* Persson, . G. A. (AB Draco, Res. Development Lab., Lund, weden). *Acta Physiol. Scand.* 87(3):334-343, 1973.

he right great splanchnic nerve was stimulated in 5 pentobarbital-anesthetized cats. Effects on allbladder pressure, resistance to flow through he sphincter of Oddi, and (in 6 cats) intramural uodenal pressure were evaluated. By nerve timulation, the sphincter was consistently ontracted and the intestine relaxed. One cat esponded to nerve stimulation only after treatment ith 1 mg/kg propanolol. The gallbladder showed ariable slight responses, except in 3 cats where onsistent relaxation was obtained. Atropine 0.5-1 mg/kg) was given to 10 cats and blocked he effect of acetylcholine (1-5 µg/kg) which therwise caused strong sphincter contractions. holecystokinin (i.v.) relaxed the sphincter and ontracted the gallbladder. During the action f the hormone, the nervous response was countercted in the sphincter; in the gallbladder, elaxation was obtained in all cats. Norepinephine (1-4 µg/kg) mimicked the responses induced y adrenegic nerve stimulation. Contraction of he sphincter induced by nerve stimulation and y norepinephrine was inhibited by phenoxybenzamine d atropine. Relaxation of the gallbladder was revented by propranolol. It is concluded that he adrenergic splanchnic nerves and i.v. norepinephrine mainly activated α-receptors in the sphincter f Oddi (inducing contraction) and β-receptors n the gallbladder (inducing relaxation). Results btained with the nerve stimulation and the 3 locking agents also confirmed the presence of ontraction-mediating atropine-sensitive cholinoeptors in the sphincter and the gallbladder, ontraction-mediating α-receptors in the gallbladder, d relaxation-mediating β-receptors in the phincter.

4025 EFFECT OF THE C-TERMINAL OCTAPEPTIDE OF CHOLECYSTOKININ ON LOWER ESOPHAGEAL SPHINCTER PRESSURE IN MAN. *(E)* Resin, H.; Stern, D. H.; Sturdevant, R. A. L.; Isenberg, J. I. (Wadsworth VA Hosp., Los Angeles, Calif.). *Gastroenterology* 64(5):946-949, 1973.

Graded doses of synthetic C-terminal octapeptide of cholecystokinin, injected i.v., produced graded decreases in lower esophageal sphincter pressure in 7 human subjects. The onset of action occurred within 30 sec of injection, and the peak decrease occurred within 4 min after injection. At dose levels 2.5-20 ng/kg, lower esophageal sphincter pressure normalized 10 min after injection. The calculated maximal decrease which could be produced by the octapeptide of cholecystokinin was 60% of resting lower esophageal sphincter pressure. At 10, 20, and 40 ng/kg dose levels some subjects experienced slight nausea and/or stomach cramps. These side effects were mild and short-lived. These results suggest that cholecystokinin is important in the physiological control of lower esophageal sphincter pressure.

4026 GASTRIC EMPTYING AND SMALL INTESTINAL PROPULSION IN FED AND FASTED RATS. *(E.)* Poulakos, L.; Kent, T. H. (Univ. Iowa, Coll. Med., Iowa City). *Gastroenterology* 64(5):962-967, 1973.

Simultaneous and independent measurement of gastric emptying and small intestinal propulsion in rats was utilized to describe these parameters in 24-hr fasted and fed rats. The differing emission energies of the radioisotopes ^{51}Cr and ^{125}I allowed separate determination of the distribution of $Na_2{}^{51}CrO_4$ and ^{125}I-polyvinylpyrrolidone at various times after simultaneous intragastric and/or intraduodenal administration of these nonabsorbable markers. Gastric emptying of isotopes was exponential in both groups but much more rapid in fasted than fed rats. In 30 min, 90% of the test solution was emptied from stomachs of fasted rats; only 74% was removed from the stomach of fed rats in 120 min. There was also considerable difference in distribution in the small intestine between fasted and fed rats after intragastric administration of the markers with the bulk of the marker moving faster in fasted animals. The leading edge traveled further in fasted rats (75% of the length of the small intestine in 15 min). This distance was not reached in fed rats until 60 min. After intraduodenal administration of the markers the distribution in the small intestine was quite similar for fasted and fed rats. In contrast to the distribution of radioisotope, the rate of movement of the leading edge of activity in the small intestine was not greatly influenced by gastric emptying.

4027 GASTRIC AND INTESTINAL TRANSIT IN RATS MEASURED BY A RADIOACTIVE TEST MEAL. *(E.)* Purdon, R. A.; Bass, P. (Parke, Davis and Co., Ann Arbor, Mich.). *Gastroenterology* 64(5): 968-976, 1973.

Measurements of the passage of a $^{133}BaSO_4$ test meal through the stomach and small intestine of the rat were made under various test conditions and after drug treatment. These measurements consisted of: (1) the percentage of the total $^{133}BaSO_4$ emptied by the stomach and each successive segment of the small intestine; (2) the ratio of the output from a given segment to its input, the intestinal transit ratio; and (3) the emptying half-time. The emptying rate was inversely proportional to the volume of the test meal administered. Meal passage was also affected by the body weight of the test animals and by the concentration of trisodium citrate in the meal. Drugs which enhanced cholinergic mechanisms enhanced emptying also, e.g., methacholine (5.0 mg/kg s.c.), insulin (0.25 U/kg s.c.), 2-deoxy-D-glucose (50 mg/kg s.c.), metoclopramide (6.25 mg/kg p.o.), and reserpine (5 mg/kg i.p.). The following drugs delayed emptying: atropine (0.39 mg/kg s.c.), morphine (6.25 mg/kg s.c.), oxethazine (50 mg/kg p.o.), chlorpromazine (25 mg/kg p.o.), and the ganglionic blocking drug N-tert-butyl-1-4-butanediamine (6.25 mg/kg s.c.). The mechanisms controlling stomach emptying and intestinal propulsion were differentially influenced by several of the drugs studied. Most drugs which delayed stomach emptying lead to smaller volumes entering the small bowel. Others decreased small intestinal, but not stomach, emptying. Some enhanced stomach, but not intestinal, emptying and some enhanced both.

4028 MESENTERIC BLOOD FLOW AND SMALL INTESTINAL MOTILITY IN THE DOG. *(E.)* Zeigler, M. G.; Barton, R. W.; Swan, K. G. (Walter Reed Army Inst. Res., Washington, D.C.). *Surgery* 73(5): 649-656, 1973.

By comparing responses to intraarterial infusions of acetylcholine (1.5 µg/kg/min) and methacholine (0.3-0.7 µg/kg/min), the relation between intestinal motility and mesenteric blood flow was studied in the intact intestine of anesthetized dogs. The superior mesenteric arterial blood flow was measured with an electromagnetic flowmeter, and motility with an intraluminal balloon attached to a pressure transducer. Acetylcholine increased blood flow significantly (from 343 to 534 ml/min) within 1 min, but did not have a significant effect on motility. Arterial and portal pressures remained unchanged. The low dose of methacholine caused no changes in blood flow or in arterial and portal pressures; an increase in motility was not statistically significant. The largest dose of methacholine produced a transient but nonsignificant change in blood flow which could not be related to changes in motility because of a separation in time of the 2 responses. Significantly different motility responses in this preparation failed to change mesenteric blood flow. These results indicate that the normal unobstructed intestine adjusts to a wide range of motility fluctuations without compromising mesenteric blood flow and that there is no relation between blood flow and motility in the intestine of the anesthetized dog.

4029 NEOSTIGMINE-INDUCED HYPERPERISTALSIS: EFFECTS ON SECURITY OF COLONIC ANASTOMOSES. *(E.)* Yellin, A. E.; Newman, J.; Donovan, A. J. (Univ. Southern California Sch. Med., Los Angeles). *Arch. Surg.* 106(6):779-784, 1973.

4030 EFFECTS OF DRUGS AND OF ELECTRICAL STIMULATION OF THE MUSCULARIS MUCOSAE OF RABBIT LARGE INTESTINE. *(E.)* Gallacher, M.; Mackenna, B. R.; McKirdy, H. C. (Inst. Physiol., Univ. Glasgow, Scotland). *Br. J. Pharmacol.* 47(4):760-764, 1973.

4031 FUNCTION OF BILIARY TRACT (BILE DUCT AND GALLBLADDER) MOTILITY: ITS ELECTROPHYSIOLOGY. *(Jap.)* Fujino, T. (Sch. Med., Mie Univ., Tsu, Japan). *Folia Endocrinol. Jap.* 48(4):234-240, 1972.

4032 PHARMACOLOGICAL CHARACTERISTICS OF THE NON-STRIATED ANORECTAL MUSCULATURE IN CATS. *(E.)* Penninckx, F.; Kerremans, R.; Beckers, J. (St. Rafael Acad. Hosp., Louvain, Belgium). *Gut* 14(5):393-398, 1973.

4033 TOPOGRAPHY OF ESOPHAGEAL PRESSURE IN THE DOG. *(E.)* Thurlbeck, W. M.; Marshall, R. M. (Radcliffe Infirm., Oxford, England). *J. Appl. Physiol.* 34(5):590-596, 1973.

4034 THE ELECTRICAL PROFILE OF STRIPPED, ISOLATED RABBIT ILEUM. *(E.)* Hirschhorn, N.; Frazier, H. S. (Johns Hopkins Univ. Sch. Med., Baltimore, Md.). *Johns Hopkins Med. J.* 132(5): 271-281, 1973.

4035 RELATIONSHIP BETWEEN CYCLIC AMP, PHOSPHODIESTERASE ACTIVITY, CALCIUM AND CONTRACTION IN INTESTINAL SMOOTH MUSCLE. *(E.)* Andersson, R. G. G. (Sch. Med., Linkoping, Sweden). *Acta Physiol. Scand.* 87(3):348-358, 1973.

4036 ADRENERGIC, CHOLECYSTOKINETIC AND MORPHINE-INDUCED EFFECTS ON EXTRA-HEPATIC BILIARY MOTILITY. *(E.)* Persson, C. G. A. (AB Draco, Res. Development Lab., Lund, Sweden). *Acta Physiol. Scand.* suppl. 383:1-32, 1972.

4037 EFFECT OF GRADED DOSES OF OCTAPEPTIDE OF CHOLECYSTOKININ ON GALLBLADDER SIZE IN MAN. *(E.)* Sturdevant, R. A. L.; Stern, D. H.; Resin, H.; Isenberg, J. I. (Wadsworth VA Hosp., Los Angeles, Calif.). *Gastroenterology* 64(3):452-456, 1973.

4038 EFFECTS OF RAPID COOLING ON THE MECHANICAL AND ELECTRICAL ACTIVITIES OF SMOOTH MUSCLES

OF GUINEA PIG STOMACH AND TAENIA COLI. *(E.)* Magaribuchi, T.; Ito, Y.; Kuriyama, H. (Fac. Dentistry, Kyushu Univ., Fukuoka, Japan). *J. Gen. Physiol.* 61(3):323-341, 1973.

4039 EFFECTS OF ASCORBATE ON CONTRACTILE ACTIVITY OF ILEAL SMOOTH MUSCLE. *(E.)* Joiner, P. D. (Tulane Univ., Sch. Med., New Orleans, La.). *J. Pharmacol. Exp. Ther.* 185(1):84-93, 1973.

4040 COMBINED RADIOGRAPHIC, MANOMETRIC, AND HISTOLOGIC LOCALIZATION OF THE CANINE LOWER ESOPHAGEAL SPHINCTER. *(E.)* Rayl, J. E.; Balison, J. R.; Thomas, H. F.; Woodward, E. R. (VA Hosp., Lake City, Fla.). *J. Surg. Res.* 13(6): 307-314, 1972.

4041 CYCLIC-GMP INTERACTION WITH THE PARASYMPATHETIC SYSTEM OF ISOLATED RAT STOMACH. *(E.)* Puglisi, L.; Berti, F.; Folco, G. C. (Inst. Pharmacol. Pharmacognosy, Univ. Milan, Italy). *Pharmacol. Res. Commun.* 4(3):227-235, 1972.

4042 COLONIC MOTILITY IN MAN. *(E.)* Parks, T. G. (Inst. Clin. Sci., Belfast, Northern Ireland). *Postgrad. Med. J.* 49(568):90-99, 1973.

4043 SHORT-CIRCUIT CURRENT ACROSS ISOLATED RABBIT ILEUM, JEJUNUM AND DUODENUM. *(E.)* Glew, R. H.; Moore, E. J.; Wallace, C. K. (Johns Hopkins Univ. Sch. Med., Baltimore, Md.). *Proc. Soc. Exp. Biol. Med.* 142(3):857-860, 1973.

4044 RHYTHMIC CONTRACTILITY OF THE CANINE STOMACH: VARIATION AND ANATOMIC RELATIONSHIPS. *(E.)* Sugawara, K.; Chawla, R. C.; Eisenberg, M. M. (Jay Phillips Res. Lab., Univ. Minnesota, Minneapolis). *Proc. Soc. Exp. Biol. Med.* 142(3): 896-901, 1973.

4045 ELECTRICAL AND MECHANICAL ACTIVITIES OF THE LONGITUDINAL MUSCLE IN THE PERISTALTIC WAVE ELICITED BY THE INTRALUMINAL PRESSURE RAISING. *(E.)* Tsuchiya, K. (Okayama Univ. Med. Sch., Japan). *Rendic. Gastroenterol.* 4(3):115-125, 1972.

4046 RELATION BETWEEN ANTRAL AND DUODENAL PRESSURE WAVES IN MAN: A SEMI-AUTOMATED METHOD OF ANALYSIS. *(E.)* Roze, C.; Couturier, D.; Debray, C. (Bichat Hosp., Paris, France). *Rendic. Gastroenterol.* 4(3):134-137, 1972.

4047 ELECTROPHYSIOLOGICAL STUDIES ON THE PERISTALTIC PROPAGATION OF THE DENERVATED INTESTINAL TRACT. *(Jap.)* Hikita, H. (Sch. Med., Tokushima Univ., Japan). *Shikoku Acta Med.* 28(1): 159-172, 1972.

4048 MECHANISM OF ACTION OF PURIFIED SCORPION TOXIN ON THE ISOLATED RAT INTESTINE. *(E.)* Cunha Melo, J. R.; Freire-Maia, L.; Tafuri, W. L.; Maria, T. A. (Fac. Med., UFMG, Belo Horizonte, Brazil). *Toxicon* 11(1):81-84, 1973.

4049 ALTERATION OF ELECTRICAL AND MOTOR ACTIVITY OF HUMAN AND DOG RECTUM BY DIPHENYLHYDANTOIN. *(E.)* Vanasin, B.; Bass, D. D.; Mendeloff, A. I.; Schuster, M. M. (Baltimore City Hosp., Md.). *Am. J. Dig. Dis.* 18(5):403-410, 1973.

4050 RATE OF PASSAGE OF DIGESTA IN SHEEP. I. THE EFFECT OF LEVEL OF FOOD INTAKE ON MARKER RETENTION TIMES ALONG THE SMALL INTESTINE AND ON APPARENT WATER ABSORPTION IN THE SMALL AND LARGE INTESTINES. *(E.)* Grovum, W. L.; Williams, V. J. (Sch. Rur. Sci., Univ. New England, Armidale, Australia). *Br. J. Nutr.* 29(1):13-21, 1973.

4051 EFFECTS OF LIQUID DIET ON COLON MOTILITY: IN VITRO STUDY IN THE RAT. *(Fr.)* Le Goff, P.; Thouvenot, J. (no affil.). *C. R. Soc. Biol. (Paris)* 166(6/7):919-922, 1972. 1972.

4052 THE EFFECT OF pH CHANGES AND IONIZATION ON THE ACTION OF EPINEPHRINE UPON THE ISOLATED RABBIT ILEUM. *(E.)* Reynolds, R. C.; Hardman, H. F. (Dept. Pharmacol., Univ. Michigan, Ann Arbor). *Eur. J. Pharmacol.* 20(3):249-255, 1972.

4053 IV. THE CENTRAL CONTROL OF GASTROINTESTINAL MOTILITY. *(Jap.)* Zeniba, T. (Sch. Med., Hiroshima Univ., Japan). *J. Physiol. Soc. Jap.* 34(5):289-295, 1972.

4054 INTRACELLULAR CYCLIC ADENOSINE 3',5'-MONOPHOSPHATE AND RELAXING EFFECTS OF ISOPRENALINE AND PAPAVERINE ON SMOOTH MUSCLE OF INTESTINE. *(E.)* Takayanagi, I.; Uchida, M.; Inatomi, N.; Tomiyama, A.; Takagi, K. (Fac. Pharm. Sci., Univ. Tokyo, Japan). *Jap. J. Pharmacol.* 22(6):869-871, 1972.

See also, 3963, 3993, 4347, 4892.

4055 ACTIVATION OF GUANYL CYCLASE AND ADENYL CYCLASE BY SECRETIN.

(E.) Thompson, W. J.; Williams, R. H.; Little, S. A. (Dept. Med., Univ. Washington, Seattle). *Biochim. Biophys. Acta* 302(2):329-337, 1973.

Properties of rat liver guanyl cyclase and adenyl cyclase and the effects of hormones on the activity of these enzymes have been investigated *in vitro*. Secretin (2×10^{-7}-60×10^{-7}M) stimulates guanyl cyclase activity of 18,000 x g supernatants of rat liver homogenates with no change in the Michaelis-Menten constant for guanosine triphosphate (3.8×10^{-5}M). Insulin (10^{-12}-10^{-7}M) glucagon (10^{-9}-10^{-6}M), and hydrocortisone acetate (75 or 300 μM) *in vitro* have no effect on guanyl cyclase activity whether secretin is present or not. *p*-Chloromercuriphenyl sulfonate (4×10^{-5}M) completely inhibits guanyl cyclase activity; this inhibition is reversed by dithiothreitol. *p*-Chloromercuriphenyl sulfonate-dithiothreitol treatments have no effect on the sensitivity of the enzyme to secretin stimulation. Therefore, sulfhydryl groups may be involved in the regulation of the activity of liver guanyl cyclase. Adenyl cyclase activity of rat liver homogenate is stimulated by secretin to approximately 50% of the stimulation caused by glucagon. Using hormone concentrations that maximally stimulate homogenate adenyl cyclase, experiments with combinations of glucagon, secretin, and isoproterenol indicate that only secretin and isoproterenol do not have additive effects. Propranolol (8-300 μM) blocks stimulation due to 8 μM isoproterenol, but does not affect stimulation by 0.42 μM secretin or 0.15-0.015 μM glucagon. Insulin has no effect on either glucagon- or secretin-stimulated liver homogenate adenyl cyclase activity.

4056 EFFECTS OF AN ELEMENTAL DIET IN HEALTHY VOLUNTEERS.

(E.) Perrault, J.; Devroede, G.; Bounous, G. (Unit Gastroenterol. Res., Univ. Sherbrooke, Canada). *Gastroenterology* 64(4): 569-576, 1973.

Healthy volunteers (15 male and 3 female, aged 21-31 yr) were assigned at random to eat exclusively either a control diet, consisting of 10% whole casein, 14% long-chain triglycerides, 67% carbohydrates with an equivalent of 36 g of protein/day, or an elemental diet, which differed in that the protein fraction was hydrolyzed and medium-chain triglycerides were added to the lipid fraction. Neither diet had much effect on serum biochemical and hematological parameters, hepatic secretion of bile salts, pancreatic secretion of enzymes with standard stimuli, or transit time of radioopaque markers. The mean weight of these subjects decreased from 147 to 145 lb in the control group and from 148 to 145 lb in the elemental group. Serum cholesterol decreased from 203 to 159 mg/100 ml in the control group and from 204 to 189 mg/100 ml in the elemental group. It is concluded that the elemental diet investigated in this study is safe for human use for a period of at least 12 days.

4057 EFFECT OF EXERCISE ON GASTROINTESTINAL SECRETIONS.

(E.) Konturek, S. J.; Tasler, J.; Obtulowicz, W. (Inst. Pathol., Krakow, Poland). *J. Appl. Physiol.* 34(3):324-328, 1973.

The effect of exercise on gastric, pancreatic, and hepatic exocrine secretion was assessed in conscious dogs with gastric, pancreatic, and biliary fistulas and with either vagally innervated or vagally denervated pouches. Animals were exercised on a treadmill by running at a rate of 10 km/hr for a 15-min period. In control tests, with feeding but without exercise, vagally innervated gastric secretion reached a peak at the end of the 1st hr after feeding and then declined to 80% of peak during the remainder of the infusion. Exercise caused a depression of 35% in the response of vagally innervated and denervated gastric secretion to a meat meal and to pentagastrin and a fall in gastric mucosal blood flow determined by aminopyrine clearance. In the pancreas, exercise depressed by 50% the secretion of both fluid and bicarbonate stimulated by a meat meal, secretin, and intraduodenal instillation of acid. Exercise did not significantly alter food-induced bile volume and bicarbonate secretion. These findings provide evidence that exercise causes inhibition of gastric acid and pancreatic bicarbonate secretion. The inhibitory mechanisms were not determined except for the decrease in gastric mucosal blood flow.

4058 NATURE OF FECAL STEROLS AND INTESTINAL BACTERIAL FLORA.

(E.) Martin, W. J.; Subbiah, R.; Kottke, B. A.; Birk, C. C.; Naylor, M. C. (Mayo Clin., Rochester, Minn.). *Lipids* 8(4):208-215, 1973.

Sterol excretion in the spontaneously atherosclerosis-susceptible White Carnean (WC) pigeon, the Silver King (SK) pigeon, and the Show Racer (SR) pigeon was studied by thin-layer chromatography (TLC), argentation TLC, and gas-liquid chromatography. These pigeons excreted no coprostanol or coprostanone derivatives of sterols, whereas in man these 5β-stanols account for nearly 50% of the total fecal sterols. Incubation of ^{14}C-labeled cholesterol with pigeon feces indicated that these pigeons were unable to convert cholesterol to coprostanol while human feces converted 66% of the cholesterol into coprostanol. Bacteriologic examination revealed the absence of gram-negative anaerobic flora and of members of the genus *Bifidobacterium* in both the WC and SR pigeons. On the other hand, 1 of the 2 SK pigeons examined showed evidence of both *Bacteroides fragilis* and *B. bifidum* in the upper intestinal tract. No unusual aerobic flora characteristics were noted in these pigeons. The results obtained in this study suggest that the anaerobic gram-negative flora and possibly the *Bifidobacterium* may be responsible, at least in part, for the chemical conversion of cholesterol to coprostanol.

4059 THE PURIFICATION AND PROPERTIES OF A SINGLE CHICKEN PEPSINOGEN FRACTION AND THE PEPSIN DERIVED FROM IT.

(E.) Green, M. L.; Llewellin, J. M. (Natl. Inst. Res. Dairying,

Shinfield, Reading, England). *Biochem. J.* 133(1):105-115, 1973.

4060 SPONTANEOUS SALIVATION IN THE RABBIT SUBMANDIBULAR GLAND. *(E.)* Smaje, L. H. (Dept. Physiol., Univ. Coll., London, England). *J. Physiol. (Lond.)* 231(1):179-193, 1973.

4061 ON THE FUNCTION OF MYOEPITHELIAL CELLS IN SALIVARY GLANDS. *(E.)* Emmelin, N.; Gjorstrup, P. (Inst. Physiol., Univ. Lund, Sweden). *J. Physiol. (Lond.)* 230(1):185-198, 1973.

See also, 4102.

SECRETION AND METABOLISM

Stomach

4062 ANTIBODY TO GASTRONE-ENDOGENOUS INHIBITOR OF GASTRIC SECRETION. *(E.)* Rosenthal, W. S.; Balanzo, J. T.; Glass, G. B. J. (New York Med. Coll., N.Y.). *Am. J. Dig. Dis.* 18(5):349-359, 1973.

By repeated injections of gastrone B obtained by Sephadex G-100 fractionation of pooled anacid human gastric juice and emulsified in Freund's adjuvant antigastrone antibody was produced in rabbits. The antigastrone antibody was an IgG on immunoelectrophoresis and formed a single precipitin arc against the material injected. Fractions containing the bulk of biologically active gastrone B material gave single precipitin arcs at concentrations of 0.25-0.5 mg/ml by double immunodiffusion against the rabbit anti-gastrone sera. Fractions containing only gastrone A did not react with the antibody. A single precipitin arc also formed when pooled unfractionated anacid human gastric juices were tested against 4 rabbit antigastrone sera; no precipitin lines were obtained with 3 normal acid human gastric juices. A total of 80 biologic assays on rats with chronic gastric fistula demonstrated complete removal of the inhibitory activity of gastrone B solutions on gastric secretion by immune precipitation with gastrone B antibody. Normal rabbit serum had no effect on the biologic activity of gastrone B under similar conditions. The development of the antibody to gastrone B with no demonstrable cross-reactivity to other nondialyzable materials in human gastric juice suggests the gastrone preparation used is homogeneous and that this antibody can be used for further study of gastrone's role in gastrointestinal physiology and pathology. These findings are compatible with the hypothesis that gastrone B is a small glycoprotein or a glycopolypeptide contained in mucus and secreted into the lumen of the stomach with mucus from epithelial structures.

4063 GASTRIN CONCENTRATION IN GASTRIC MUCOSA. EFFECT OF FOOD AND ANTRECTOMY. *(E.)* Evans, J. C.; Reeder, D. D.; Thompson, J. C.; (Univ. Texas Med. Br., Galveston). *Arch. Surg.* 106(5):717-718, 1973.

Feeding caused no significant change in the gastrin concentration, measured 90 min postprandially in either the fundic or antral mucosa of intact dogs. Similarly, feeding had no effect on the fundic mucosal gastrin levels in antrectomized dogs. Antrectomy caused a 70% reduction in the concentration of gastrin in fundic mucosa, but had no effect on basal levels of circulating serum gastrin. This reduction in gastrin may indicate that antral gastrin synthesis contributes to fundic levels, or that antrectomy depletes extra-antral sources of gastrin to maintain circulating serum gastrin levels. The findings presented here suggest that since the stimulus of feeding causes a prompt release of immunocompetent gastrin into the circulation, feeding may stimulate a rapid antral synthesis as well as release of gastrin, and that gastrin of antral origin may well contribute to fundic levels.

4064 EFFECTS OF THE ATP ANALOG 5'-ADENYLYL METHYLENEDIPHOSPHONATE ON ACID SECRETION IN FROG GASTRIC MUCOSA. *(E.)* Kidder, G. W. (Dept. Biol., Wesleyan Univ., Middletown, Conn.). *Biochim. Biophys. Acta* 298(3):732-742, 1973.

Inhibition of acid secretion, increased transepithelial potential difference, and increased lag before resumption of secretion after anoxia occurred *in vitro* after addition of the ATP analog, 5'-adenylyl methylenediphosphonate (AMP-PCP) in a concentration of 10 mM to serosal solution bathing gastric mucosa from the bullfrog (*Rana catesbiana*). These effects are similar in direction and magnitude to those caused by ATP. While AMP-PCP stimulates the production of inosine in this tissue, it is apparently not a precursor for inosine, and seems to act by stimulating catabolism of endogenous purines. AMP-PCP is not a substrate for adenosine deaminase or AMP deaminase, has no marked effects on mitochondrial respiration or phosphorylation, and is not catabolized by gastric mucosa. Washout kinetics of AMP-PCP loaded tissues show this material to be exiting with a single exponential time constant of about 10 min. By contrast, inosine shows 2 washout exponentials of 5 and 30 min. Analysis suggests that the cells may be more permeable to AMP-PCP than to inosine. If so, the lack of stimulatory effect of ATP added under anaerobic conditions to this system is not due to a failure of ATP to penetrate, but rather to the acid secretory mechanism being insensitive to cytoplasmic ATP levels. It is suggested that the inhibitory action of AMP-PCP (and by extension, ATP and ADP) is due to the possession by these compounds of a nitrogen with an unshared pair of electrons, as has been suggested for other secretory inhibitors.

4065 IRON BINDING OF GASTRIC MUCINS. *(E.)*

Bella, Jr., A.; Kim, Y. S. (VA Hosp., San Francisco, Calif.). *Biochim. Biophys. Acta* 304(2):580-585, 1973.

A comparison was made of the iron-binding capacities of isolated mucin fractions from the antral and fundic regions of dog stomachs. No particular glycoprotein fraction had an unusually high iron-binding capacity. Other macromolecules with a negatively charged carboxyl or sulfate groups also bound iron. However, binding is not totally a function of charge present in the molecule since dextran alone showed significant binding ability. Also, binding is not proportional to charge, for a negatively charged polygalacturonate bound less iron than dextran. It appears that no single molecular entity is responsible for the binding of iron in the gastric juice. The whole variety of mucinous and other macromolecular substances in the gastrointestinal tract may aid in keeping iron available for forming complexes which can be taken up by the mucosa.

4066 COMPARATIVE EFFECTS OF ANTROCOLIC TRANSPOSITION AND ANTRECTOMY ON FUNDIC MUCOSA AND ACID SECRETION OF THE RAT. *(E.)*

Lehy, T.; Bonnefond, A.; Dubrasquet, M.; Nasca, S.; Lewin, M.; Bonfils, S. (Bichat Hosp., Paris, France). *Gastroenterology* 64(3):421-428, 1973.

Male Wistar rats were surgically prepared with chronic gastric fistulae in the rumen: 15 had the whole antrum transposed to the colon, 11 had an antrectomy, and 11 with intact stomachs served as controls. From the 15th to the 45th day after the operation acid secretory tests were made twice weekly. On the 45th day the fundus was prepared for cellular count estimation. The average acid output was not significantly different in controls and antrectomies (112 ± 18 μEq/2 hr and 96 ± 18 μEq/2 hr resp.) but significantly increased in antrocolic transpositions (384 ± 24 μEq/2 hr). It would appear that in a physiologic resting state antral gastrin does not play an important role. At 6 weeks after surgery there was no significant difference between cell count data for controls and antrectomies. Only the height of the fundic mucosa in the latter decreased significantly. It is possible that a greater hypoplasia would develop after a longer time. However, antrocolic transposition caused a hyperplasia of parietal and chief cell populations, as well as a significant increase in the height and volume of the fundic mucosa. It is concluded that high endogenous gastrin levels produced by antrocolic transposition exert a rapid trophic influence on fundic mucosa. Simple removal of the antrum has no evident antitrophic effect within a similar postoperative period.

4067 RENAL EXTRACTION AND EXCRETION OF ENDOGENOUS GASTRIN IN THE DOG. *(E.)*

Davidson, W. D.; Springberg, P. D.; Falkinburg, N. R. (Harbor Gen. Hosp., Torrance, Calif.). *Gastroenterology* 64(5):955-961, 1973.

The instillation of acetylcholine-sodium bicarbonate into the stomach of 30 anesthetized dogs induced endogenous gastrin secretion. Blood samples, drawn simultaneously from an artery and renal vein, were assayed for gastrin with a double antibody radioimmunoassay. An average of 30% of renal artery gastrin was extracted from the blood by the kidney. In 3 dogs, simultaneous clearances of gastrin, inulin, and *p*-aminohippurate were measured. An average of less than 2% of the renal artery gastrin extracted by the kidney was excreted in the urine. In all dogs the mean gastrin clearance was 0.44 ml/min/kidney. Thus, the dog kidney is an important site for the extraction and degradation of endogenous gastrin. There is a possibility that renal gastrin extraction is less efficient at lower levels of circulating gastrin or that gastrin may circulate in several forms, with varying extraction efficiencies.

4068 ISOLATION OF GASTRIC VITAMIN B_{12}-BINDING PROTEINS USING AFFINITY CHROMATOGRAPHY. I. PURIFICATION AND PROPERTIES OF HUMAN INTRINSIC FACTOR. *(E.)*

Allen, R. H.; Mehlman, C. S. (Washington Univ. Sch. Med., St. Louis, Mo.). *J. Biol. Chem.* 248(10):3660-3669, 1973.

Human intrinsic factor has been isolated from gastric juice and the protein purified 835-fold with a yield of 85%, using affinity chromatography on vitamin B_{12}-Sepharose as the only purification technique. The final preparation was homogenous on polyacrylamide gel electrophoresis and sedimentation equilibrium ultracentrifugation. When 20 μg of the isolated protein was administered to a patient with a

9-yr history of pernicious anemia, it corrected vitamin B_{12} malabsorption. Human intrinsic factor bound 30 µg vitamin B_{12}/mg protein and contained a single vitamin B_{12}-binding site with an association constant for vitamin B_{12} of 1.5 x 10^{10}/M. Its molecular weight, determined by sedimentation equilibrium ultracentrifugation, was 45,200-47,700, while that determined by amino acid and carbohydrate analyses was 44,200. The protein contained 15.0% carbohydrate, which accounts for high molecular weights (59,000-66,000) obtained with sodium dodecyl sulfate-polyacrylamide gel electrophoresis and gel filtration. Human intrinsic factor formed dimers and higher molecular weight oligomers in the presence of vitamin B_{12}. Complete conversion to oligomeric forms has not been observed, suggesting that human intrinsic factor is microheterogeneous and that only certain forms are capable of forming oligomers. When vitamin $_{12}$ binds to human intrinsic factor, the spectral maximum for vitamin B_{12} shifts from 361 nm to 62 nm and the absolute absorbance at 361 nm ncreases by 32%.

069 IRON-BINDING BY MACROMOLECULAR COMPONENTS OF HUMAN GASTRIC JUICE.

(E.) Swan, . H. J.; Glass, G. B. J. (New York Med. Coll., ew York, N.Y.). *J. Lab. Clin. Med.* 81(5):719-32, 1973.

he role of human gastric juice and its macro-olecular components in iron-binding and the rotecting of iron salts from precipitation at n alkaline pH has been studied. Various fractions f sulfated and nonsulfated glycoproteins from uman gastric juice, dog chondroitin sulfate A, nd triple crystalline hog pepsin have manifested imilar iron-binding effects. Complexing of iron ith buffer was noted in some instances, even in he absence of a protein "binder." The amount f iron kept in solution by gastric juice at pH 8 nd claimed to represent iron bound to glycoprotein as at least 10 times higher than that precipitated rom the same supernatant by acetone at pH 2, a rocedure known to precipitate total glycoproteins. quilibration dialysis of human gastric juice in ater against $^{59}FeCl_3$ "bound" to concentrated astric juice at pH 2, and $^{59}FeCl_3$ alone in arious buffers of a wide range of pH and ionic trength revealed no specific component having ne electrophoretic mobility of known macro-olecules in gastric juice. Electrophoresis of Fe previously bound to gastric juice and eluted rom Sephadex G-150 as a single peak revealed ndependent mobility for the ^{59}Fe, separate from ne excluded protein peak. The iron "bond" nich may form in alkaline pH is weak, probably onic. It is readily dissociated by electro-oresis, detergent action, or changes in ionic rength and pH. Neuraminidase digestion caused nsiderable reduction in iron-binding capacity gastric juice, suggesting that sialic acid erminal groups are involved in iron binding. us, the binding of iron by any macromolecular mponent of human gastrin is non-specific, and the protective effect of whole gastric juice against iron precipitation at pH 8 is confirmed. This non-specific iron binding is probably of little significance in influencing iron availability for intestinal absorption.

4070 THE EFFECT OF CITRIC ACID AND ITS SODIUM SALTS IN TEST MEALS ON THE GASTRIC OUTPUTS OF ACID AND OF CHLORIDE.

(E.) Hunt, J. N.; Knox, M. T. (Guy's Hosp. Med. Sch., London, England). *J. Physiol. (Lond.)* 230(1):171-184, 1973.

Five subjects were given 750 ml test meals lasting 10-20 min, containing 0-300 mN citric acid, monosodium dihydrogen (NaH_2) citrate, disodium monohydrogen (Na_2H) citrate, or trisodium (Na_3) citrate. An increase in the concentration of sodium citrate in the range 0-125 mN (pH about 8) gave increasing outputs of acid and chloride. Increasing the Na_3 citrate concentration from 125 to 200 mN did not change the mean outputs of acid or of chloride. Increases in Na_2H citrate (pH about 5), NaH_2 citrate (pH about 3.8), and citric acid (pH about 2.4) concentrations from 5 to 300 mN produced falls in outputs of acid and of chloride. For constant concentrations of citrate ion, the more acid the meal, the lower the secretion of acid and chloride. There was evidence of loss of acid from the stomach by diffusion with the more acid meals.

4071 POTENTIATION BETWEEN PENTAGASTRIN AND BETHANECHOL CHLORIDE IN STIMULATION OF GASTRIC SECRETION FROM ISOLATED EX VIVO CANINE STOMACH PERFUSED WITH HOMOLOGOUS BLOOD.

(E.) Kowalewski, K.; Saab, M. (Surg.-Med. Res. Inst., Univ. Alberta, Edmonton, Canada). *Pharmacology* 7:225-236, 1972.

The totally isolated canine stomach, perfused with homologous blood, is able to secrete juice rich in H^+ for several hours. This *ex vivo* preparation was used for the study of secretion stimulated by pentagastrin (2-64 µg/hr) and/or bethanechol chloride (125-1,000 µg/hr). Maximum HCl and pepsin outputs were obtained with 16 µg/hr pentagastrin and 500 µg/hr bethanechol infused separately or combined. Combinations of pentagastrin plus bethanechol used in this study gave significantly higher outputs of HCl and pepsin than could be accounted for by adding stimulatory effects. True potentiation with regard to acid and pepsin secretion was evident when the cholinergic drug was infused in combination with pentagastrin and apparently occurs in the stimulation of secretion from the totally isolated canine stomach perfused by homologous blood. Mechanical activity and myoelectrical activity of isolated stomachs were also studied. These activities varied with the changes in stimulation. The mechanical activity markedly increased when cholinergic drug was added to pentagastrin stimulation. Bethanechol chloride appeared to be a very potent stimulant of mechanical activity of the isolated stomach.

4072 THE ROLE OF ENDOGENOUS HISTAMINE ON GASTRIC ACID SECRETION. *(E.)* Limlomwongse, L.; Thithapandha, A.; Sobhon, P. (Fac. Sci., Mahidol Univ., Bangkok, Thailand). *Proc. Soc. Exp. Biol. Med.* 142(4):1281-1286, 1973.

Compound 48/80 (reaction products of p-methoxy-N-methylphenethylamine with formaldehyde) decreased basal acid secretion in the gastric mucosa of adult frogs (*Rana tigerina*) from 2.1 to 0.3 $\mu Eq/cm^2/hr$ with a concommitant increase in potential difference across the gastric mucosa. However, the mast cells were almost completely degranulated. This suggests that the mast cells of the frog contain little or no histamine. The nonionic detergent, Triton X-100 (1 mg/ml), a nonselective histamine liberator, released approximately 50% of the histamine in the mucosa, primarily from enterochromaffin-like cells; a corresponding increase occurred in acid secretion. When the histamine content of the tissue was reduced by overnight incubation with 3-hydroxybenzyloxtamine [α-(aminooxy)-m-cresol] dihydrogen phosphate so that the residual histamine content was 2.6 μg/g mucosa, the addition of Triton X-100 no longer stimulated acid secretion during the first 20-40 min. The amount of histamine released by pentagastrin (10^{-5} M) was too small to be measured by the method employed. Since pentagastrin stimulated the release of acid after either 40/80 or Triton X-100 but did not release histamine, pentagastrin can act directly on oxyntic cells to stimulate their secretion.

4073 EFFECT OF SOME BIOGENIC AMINES, RESERPINE AND ATROPINE ON THE SPONTANEOUS GASTRIC SECRETION. *(E.)* Billewicz-Stankiewicz, J.; Gorny, D.; Zajaczkowska, M.; Flisiak, A. (Med. Acad., Lublin, Poland). *Acta Physiol. Pol.* 23(2):277-283, 1972.

4074 THE EFFECT OF SODIUM FLUORIDE ON THE FROG GASTRIC MUCOSA. *(E.)* Gammage, D.; Shoemaker, R.; Feagin, F. (Univ. Alabama Sch. Dentistry, Birmingham). *Ala. J. Med. Sci.* 10(1):98-102, 1973.

4075 RENAL INACTIVATION OF ENDOGENOUS GASTRIN IN DOGS. *(E.)* Booth, R. A. D.; Reeder, D. D.; Hjelmquist, U. B.; Brandt, Jr., E. N.; Thompson, J. C. (Univ. Texas Med. Br., Galveston). *Arch. Surg.* 106(6):851-854, 1973.

4076 ACTION OF SOME N-METHYL DERIVATIVES OF HISTAMINE ON GASTRIC SECRETION OF THE RAT. *(E.)* Bertaccini, G.; Cavaggioni, A.; Zappia, L.; Mossini, F. (Inst. Pharmacol., Univ. Parma, Italy). *Pharmacol. Res. Commun.* 5(1):71-80, 1973.

4077 CONTROL OF INTRINSIC FACTOR SECRETION IN RATS: RELATION OF VITAMIN B_{12} DEFICIENCY AND GASTRIC HORMONAL SECRETION. *(E.)* Giorgini, Jr., G. L.; Iannuccilli, E.; Leduc, L. P.; Thayer, Jr., W. R. (Rhode Island Hosp., Providence). *Am. J. Dig. Dis.* 18(4):332-336, 1973.

4078 OSCILLATIONS OF H^+ SECRETION AND ELECTROGENIC PROPERTIES IN THE ISOLATED FROG GASTRIC MUCOSA. *(E.)* Flemstrom, G. (Biomed. Ctr., Univ. Uppsala, Sweden). *Biochim. Biophys. Acta* 298(2):369-375, 1973.

4079 A RADIOISOTOPE METHOD OF MEASURING INTRAGASTRIC VOLUMES USING THE VOLEMETRON. *(E.)* Hinder, R. A.; Bremner, C. G. (Dept. Surg., Univ. Witwatersrand, Johannesburg, South Africa). *Gut* 14(2):113-115, 1973.

4080 KINETICS OF GASTRIN RELEASE AND DEGRADATION IN RESPONSE TO ELECTRICAL VAGAL STIMULATION IN THE DOG. *(E.)* Lanciault, G.; Bonoma, C.; Karreman, G.; Brooks, F. P. (Univ. Pennsylvania Sch. Med., Philadelphia). *Proc. Soc. Exp. Biol. Med.* 142(3):740-743, 1973.

4081 THE EFFECT OF SHOCK ON CIRCULATING SERUM GASTRIN CONCENTRATION. *(E.)* Evans, J. C. W.; Reeder, D. D.; Thompson, J. C. (Univ. Texas Med. Br., Galveston). *Tex. Rep. Biol. Med.* 30(4):313-317, 1972.

4082 HISTAMINE AND CYCLIC 3',5'-AMP IN GASTRIC ACID SECRETION. *(E.)* Domschke, W.; Domschke, S.; Classen, M.; Demling, L. (Dept. Med., Univ. Erlangen-Nuremberg, Erlangen, Germany). *Nature (Lond.)* 241(5390):454-455, 1973.

4083 INHIBITORY PROPERTIES OF HUMAN GASTRIC JUICE ON RAT GASTRIC SECRETION: QUANTITATIVE DIFFERENCE IN INHIBITION FOUND IN FIVE PHYSIOPATHOLOGICAL STATES. *(Fr.)* Rheault, M. J.; Tetreault, L. (Hotel Dieu, Univ. Montreal, Canada). *Can. J. Surg.* 15(6):374-383, 1972.

4084 ACTION OF SEROTONIN ON INSULIN STIMULATED GASTRIC SECRETION, BLOOD GLUCOSE, AND SERUM ELECTROLYTE LEVELS IN THE CAT. *(E.)* Bugajski, J.; Hano, J.; (Dept. Pharmacol., Polish Acad. Sci., Krakow). *Diss. Pharm. Pharmacol.* 24(5):435-446, 1972.

4085 GASTRIC BIOPSIES IN METABOLIC INVESTIGATIONS: IN VITRO STUDIES ON POTASSIUM LOSS AND GLYCOLYSIS IN HUMAN GASTRIC MUCOSAL BIOPSIES. *(E.)* Krag, E.; Dalsager, H. H. (Dept. Clin. Chem., Univ. Aarhus, Denmark). *Endoscopy* 4:190-193, 1972.

4086 ACTION OF GRADED DOSES OF INSULIN ON GASTRIC SECRETION, BLOOD GLUCOSE AND BLOOD SERUM ELECTROLYTE LEVELS IN THE RAT. *(E.)* Bugajski, J.; Danek, L.; Wantuch, C. (Dept. Pharmacol., Polish Acad. Sci., Krakow). *Diss. Pharm. Pharmacol.* 24(5):447-458, 1972.

4087 IN VIVO RECORDING OF THE ACTIVITY OF MONOVALENT IONS IN THE GASTROINTESTINAL TRACT DURING SECRETORY PROCESSES BY MEANS OF SELECTIVE ELECTRODES. *(Rus.)* Bakuradze, A. N.; Lapauri, D. A. (Tbilisi State Med. Inst., USSR). *Soobshch. Akad. Nauk Gruz. SSR* 69(1):153-156, 1973. 153-156, 1973.

4088 SECRETORY AND VASCULAR CHANGES IN THE RAT STOMACH AFTER COMPULSORY SWIMMING AND VAGOTOMY. *(E.)* Billewicz-Stankiewicz, J.; Gorny, D.; Zajaczkowska, M. (Med. Acad., Lublin, Poland). *Acta Physiol. Pol.* 23(2):249-253, 1972.

4089 GASTRIC SECRETION IN THE RAT FOLLOWING HISTIDINE LOADING. *(E.)* Thompson, J. H.; Aures, D.; Yuen, L.; Angula, M. (Univ. California, Los Angeles Sch. Med.). *Experientia* 29(2):179-180, 1973.

See also, 3925, 3927, 3928, 3972, 4057, 4361, 4383, 4386, 4420, 4854.

SECRETION AND METABOLISM

Pancreas

4090 THE EFFECT OF THYROIDECTOMY ON PANCREATIC EXOCRINE SECRETION. *(E.)* Kaynan, A.; Ben-Ari, G. Y.; Dreiling, D. A. (Mt. Sinai Sch. Med., New York, N.Y.). *Am. J. Gastroenterol.* 59(4):336-339, 1973.

Supression of pancreatic oxidative metabolism by thyroidectomy caused a 50% reduction in the basal rate of flow, of bicarbonate elaboration, and of enzyme secretion. The basal maximum bicarbonate concentration following secretin was not affected. Secretin- and pancreozymin-stimulated secretion underwent no changes after thyroidectomy when compared to rates of flow, maximum bicarbonate concentrations, and rates of bicarbonate secretions in the same animals before thyroidectomy. The enzyme concentration after pancreozymin was significantly depressed. The rate of enzyme secretion, however, was diminished 40% following thyroidectomy both in the secretin and pancreozymin responses. After thyroidectomy, none of the dogs developed symptoms of hypothyroidism since ectopic thyroid is the rule rather than the exception in dogs. However, serum thyroxine levels were suppressed to the same extent as after propylthiouracil therapy. Propylthiouracil has been reported to be beneficial in the treatment of acute pancreatitis.

4091 SH-GROUPS ON THE SURFACE OF PANCREAS CELLS INVOLVED IN SECRETIN STIMULATION AND GLUCOSE-MEDIATED SECRETION. *(E.)* Wizemann, V.; Schulz, I.; Simon, B. (Max Planck Inst. Biophys., Frankfurt/Main, Germany). *Biochim. Biophys. Acta* 307(2):366-371, 1973.

A high molecular weight (10,000) derivative of p-chloromercuribenzoic acid (PCMB), obtained by reacting PCMB with aminoethyl-Dextran T10, was perfused through an isolated preparation of cat pancreas. Pancreatic secretion was stimulated by addition of secretin (0.1 U/min) to the perfusate. PCMB-Dextran T10 inhibited pancreatic fluid and electrolyte secretion by 47%, but this inhibition was reversed by a perfusate containing 10^{-3}M cysteine. When glucose (15 mM) in the perfusate was replaced by Krebs intermediates (5 mM each of α-ketoglutarate, fumarate, and pyruvate), PCMB caused an inhibition of only 26%. When secretin was replaced with 10^{-3}M dibutyryl cyclic AMP + 5 x 10^{-3}M theophylline, PCMB-Dextran T10 caused an inhibition of 15%. The mercurial compound was unable to inhibit secretion when both secretin and glucose were replaced by their substitutes. Because of the high molecular weight of PCMB-Dextran T10, these findings suggest that sulfhydryl groups on the surface of pancreatic cells are essential for both secretin-stimulated and glucose-mediated pancreatic secretion. These results obtained *in vitro* may differ from conditions *in vivo* since the glycoprotein surface coat in the intact system may prevent PCMB-Dextran T10 from reaching functionally important sulfhydryl groups. It is also possible that isolation of the brush border induces configurational changes in proteins, thus altering the exposure of sulfhydryl groups.

4092 INFLUENCE OF CHRONIC ADMINISTRATION OF PENTAGASTRIN ON THE PANCREAS IN HYPOPHYSECTOMIZED RATS. *(E.)* Mayston, P. D.; Barrowman, J. A. (London Hosp. Med. Coll., England). *Gastroenterology* 64(3):391-399, 1973.

Hypophysectomy of adult male Wistar rats, followed by injection of saline or pentagastrin (2 mg/100 g/day s.c. in 5 divided doses for 11 of 15 days), initially reduced body weights by 15% below their original value. Administration of pentagastrin to hypophysectomized rats also increased the mean weight of the pancreas by 86% and changed its nucleic acid composition (increase in RNA content and RNA:DNA ratio and decrease in the DNA content), indicating an increase in the cytoplasmic content of the pancreas. Qualitatively similar changes occurred in intact rats treated with pentagastrin, but in hypophysectomized rats the total DNA content increased by 37%, indicating a concomitant increase in the nuclear content of the tissue. Acinar cell size remained unchanged. Increases also occurred in the weight of the gastric fundus and a segment of duodenum. These findings suggest that administration of pentagastrin to hypophysectomized rats stimulates both pancreatic hyperplasia and hypertrophy. The C-terminal tetrapeptide amide sequence of both pentagastrin and cholecystokinin exerts a trophic effect on part of the gastrointestinal tract, even in the absence of hormones from the pituitary or from its endocrine target organs. These results are compatible with the hypothesis that some effects of the pituitary on the pancreas may be mediated by influences on endocrine-secreting cells of the gastrointestinal tract.

4093 EFFECTS OF AN ELEMENTAL DIET ON THE PANCREATIC PROTEASES IN THE INTESTINE OF THE MOUSE. *(E.)* Bounous, G.; Devroede, G.; Hugon, J. S.; Charuel, C. (Univ. Hosp. Ctr., Sherbrooke, Canada). *Gastroenterology* 64(4):577-582, 1973.

Six groups of 6 ICR Swiss mice were fed an elemental diet containing 25% casein hydrolyzate, 45% sucrose, and 23% lipid. In control groups the casein hydrolyzate was replaced by an equal amount of whole casein. Both diets were administered *ad lib* in powder form for 7 days. The trypsin and chymotrypsin-like activities were then determined titrimetrically in the chyme and in homogenate of the intestinal mucosa. Trypsin and chymotrypsin-like activities in the mucosa of mice fed hydrolyzed casein were about half the values observed in control mice. Expressed in μg/ml of protein, trypsin and chymotrypsin activities were 0.46 and 0.52 in control mice and 0.25 and 0.28, resp. in mice fed hydrolyzed casein. In the chyme, the levels of free trypsin and chymotrypsin in mice eating hydrolyzed casein were 20 and 9%, resp. lower than in control mice eating whole casein. Brush border trypsin activities in mice eating hydrolyzed casein were 66% of the values observed in controls eating whole casein. It is proposed that this reduction of pancreatic proteases may partly explain the protective effect of an elemental diet on the intestinal mucosa in the course of injury.

4094 DIFFERING SENSITIVITIES OF GALLBLADDER AND PANCREAS TO CHOLECYSTOKININ-PANCREOZYMIN (CCK-PZ) IN MAN. *(E.)* Malagelada, J. R.; Go, V. L. W.; Summerskill, W. H. J. (Mayo Clin., Rochester, Minn.). *Gastroenterology* 64(5):950-954, 1973.

The responses of gallbladder and exocrine pancreas to cholecystokinin-pancreozymin were examined in 5 healthy volunteers. Five cholecystectomized patients were also studied to validate the method for detecting gallbladder contraction. During steady state intraduodenal perfusion of normal saline containing polyethylene glycol, total outputs of bile acids and trypsin were determined for 1-hr periods (basal), then after cholecystokinin-pancreozymin was given in sequentially increasing doses (0.0039, 0.0078, 0.0156, 0.0310, 0.0625, and 0.250 Crick-Harper-Raper unit (CHR-U)/kg/min i.v.). In normal subjects gallbladder contraction (peak bile acid output) occurred at 0.0625, whereas stimulation of trypsin secretion commenced at 0.0078 CHR-U/kg/min. Thereafter, trypsin outputs increased exponentially until maximal secretion was established at 0.125 CHR-U/kg/min. After cholecystectomy, cholecystokinin-pancreozymin had no effect on bile acid output, whereas trypsin output was increased to the same extent as in normal subjects. Cholecystokinin-pancreozymin had no effect on hepatic bile secretion. These studies indicate that, in health, the pancreas is more sensitive than the gallbladder to cholecystokinin-pancreozymin. The different responses may be due to differences in the target tissue, glandular tissue and smooth muscle. Vagal influence may also be important in modifying the response. These different sensitivities are probably essential components of hormonal feedback mechanisms initiated under physiologic circumstances by products of secretion or digestion.

4095 CELL MEMBRANE RESORPTION IN THE RAT EXOCRINE PANCREAS CELL AFTER IN VIVO STIMULATION OF THE SECRETION, AS STUDIED BY IN VITRO INCUBATION WITH EXTRACELLULAR SPACE MARKERS. *(E.)* Geuze, J. J.; Poort, C. (Med. Fac., State Univ., Utrecht, Netherlands). *J. Cell Biol.* 57(1):159-174, 1973.

Pancreatic secretion in the rat, stimulated *in vivo* by pilocarpine (10 mg/100g i.v.), caused 90% of the storage granules to be discharged within 2 hr; 79% zymogen granule discharge occurred during the first hr. There was also a decrease in granule diameter. Incubation *in vitro* with ^{14}C-sorbitol indicated that maximal ingestion of this intracellular space marker occurred 3 hr after pilocarpine injection. Cell membrane measurements on cells with stimulated secretion revealed a simultaneous decrease in amount of membrane bordering the microvilli at the cell apex, lamellar processes, and tubular or sheetlike infoldings present at the latero-basal face of these cells. In 3-hr stimulated cells, having the average zymogen granule content characteristic for that phase of secretion, *in vitro* treatment with about 20% ferritin showed that the infoldings and related fragmentation vesicles had ingested ferritin and could be considered to be transport vehicles for redundant cell membrane. The finding of condensing vacuole-like structures closely apposed to the apical cell membrane, with the Golgi complex in the vicinity, suggests that part of the vesicle-vacuole population is involved in secretory protein transport. Other vesicles and vacuoles in the apical cytoplasm were assumed to have an endocytotic nature, although they never contained ferritin.

4096 THE INTERACTION BETWEEN PENTAGASTRIN AND CHOLECYSTOKININ ON PANCREATIC SECRETION IN MAN. *(E.)* Petersen, H.; Berstad, A. (Ulleval Univ. Hosp., Oslo, Norway). *Scand. J. Gastroenterol.* 8(3):257-263, 1973.

Graded doses of cholecystokinin (0.33-3 µg/kg/hr and pentagastrin (0.15-5.4 µg/kg/hr) were given as continuous i.v. infusions, either singly or in combination to each of 3 healthy male volunteers. Gastric and duodenal secretions were collected separately. Pentagastrin had no dose-dependent effect on bicarbonate, proteolytic enzyme, or bilirubin secretion. Only bicarbonate secretion increased significantly, perhaps as a result of the secondary release of secretin. Cholecystokinin infusion had a dose-dependent effect on bicarbonate, enzyme, and bilirubin secretion. Simultaneous infusion of pentagastrin had no dose-dependent or dose-independent effect on cholecystokinin-induced bicarbonate secretion. Cholecystokinin plus pentagastrin had variable effects on enzyme and bilirubin secretion, indicating that pentagastrin does not have a selective effect on these secretions. Although a low pH in the duodenal aspirate was not infrequent during pentagastrin infusion, loss of acid into the duodenum from the stomach may have occurred occasionally. It is suggested that the gastric phase of pancreatic secretion is less significant in man than in the dog.

4097 PROTEIN, AS A REGULATOR OF PANCREATIC ENZYME SECRETION IN THE RAT. *(E.)* Green, G. M.; Olds, B. A.; Matthews, G.; Lyman, R. L. (Dept. Nutr. Sci., Univ. California, Berkeley). *Proc. Soc. Exp. Biol. Med.* 142(4): 1162-1167, 1973.

Pancreatic enzyme secretion was studied in conscious, recovered male Wistar rats with bile-pancreatic juice collected directly via a cannula. When bile-pancreatic juice was collected and continuously returned to the intestine, introduction of casein (250 mg in 5 ml water) significantly increased enzyme secretion, while the same amount of acid or enzymatic hydrolyzates of casein were not effective stimulants. Diversion of bile-pancreatic juice or introduction of soybean trypsin inhibitor caused very large increases in enzyme secretion. The results support the concept of negative feedback control of pancreatic enzyme secretion. It is proposed that protein stimulates increased pancreatic enzyme secretion by reducing feedback inhibition produced by trypsin and chymotrypsin in the intestine.

4098 EFFECTS OF SELECTED DRUGS ON PANCREATIC MACROMOLECULAR TRANSPORT. *(E.)* Singh, M.; Black, O.; Webster, P. D. (VA Hosp., Augusta, Ga.). *Gastroenterology* 64(5):983-991, 1973.

The effects of certain drugs on pancreatic protein synthesis, intracellular transport, and secretion have been examined. For these studies, pooled rat pancreatic slices were pulse-labeled with ^{14}C-L-phenylalanine and migration of the ^{14}C-labeled proteins studied by chase incubation for 15, 30, 60, and 120 min. After *in vitro* incubation, subcellular particles were isolated by density gradient centrifugation, and specific activity of radioactive-labeled proteins was determined in subcellular fractions. Bethanechol chloride (1 x 10^{-3}M) did not alter the rate of transport of synthesized proteins from ribosomes into zymogen granules but increased the rate of protein secretion from zymogen granules into medium after 60 and 120 min incubation. Tetracycline and amphotericin B (3 x 10^{-6}M) impaired transport of labeled proteins from microsomes to zymogen granules as well as secretion of labeled proteins into medium. Lidocaine (4 x 10^{-4}M) increased appearance of unlabeled proteins into medium but significantly impaired transport or release of labeled proteins from zymogen granules into media.

4099 ZINC 65 SECRETION BY THE EXOCRINE PANCREAS OF CHICKS FED SOYBEAN MEAL. *(E.)* Salman, A. J.; Fernandez, R.; McGinnis, J. (Dept. Anim. Sci., Washington State Univ., Pullman). *Proc. Soc. Exp. Biol. Med.* 142(4): 1248-1251, 1973.

The effect of unheated and autoclaved soybean meal on cellular regulation of Zn-containing enzyme synthesis in the pancreas was studied in chicks. Chicks ate a diet containing soybean meal for 4 weeks, were fasted for 8 hr, injected with ^{65}Zn in HCl (7 µCi/100 g i.m.), fasted for 6-22 hr, and were then sacrificed 30-48 hr after ^{65}Zn injection. From measurements of gamma activity in the pancreas, intestine, and excreta of chicks it was found that ^{65}Zn activity was higher in the pancreas and excreta of chicks fed unheated soybean meal than in those fed autoclaved soybean meal. Feeding unheated soybean meal after 16 hr fasting resulted in a continuous depletion of pancreatic zymogen, as manifested by a rapid decrease in the percentage of ^{65}Zn activity/g of tissue, regardless of the previous diet. In contrast, almost no change occurred when autoclaved soybean meal was fed. After feeding for 2 hr, ^{65}Zn activity was higher in chicks previously fed unheated soybean meal. When fed for 6 hr, this was no longer true because of chyme excretion and failure of the pancreas to synthesize ^{65}Zn-containing enzymes as fast as it discharged them into the duodenum. These results support previous findings that unheated soybean meal induces hyperplastic types of change in the pancreas and increases synthesis of Zn-containing enzymes. The findings also support the hypothesis that unheated soybean meal increases enzyme release but fails to increase enzyme synthesis to compensate for continuous depletion.

4100 FAILURE OF THE HUMAN PLACENTA TO TRANSFER PANCREATIC GLUCAGON. *(E.)* Johnston, D. I.; Bloom, S. R.; Greene, K. R.; Beard, R. W. (King's Coll. Hosp., London, England). *Biol. Neonate* 21(5):375-380, 1972.

4101 SECRETIN-LIKE ACTIVITY OF DOPAMINE ON CANINE PANCREATIC SECRETION. *(E.)* Furuta, Y.; Iwatsuki, K.; Takeuchi, O.; Hashimoto, K. (Tohoku Univ. Sch. Med., Sendai, Japan). *Tohoku J. Exp. Med.* 108(4):353-360, 1972.

4102 THE EFFECTS OF ACTINOMYCIN D ON THE EXORBITAL LACRIMAL GLAND, PAROTID GLAND AND EXOCRINE PANCREAS OF THE RAT. KARYOMETRIC STUDY. *(E.)* Mitrova, E. (Fac. Med., Comenius Univ., Bratislava, Czechoslovakia). *Biologia (Bratisl.)* 28(3):165-172, 1973.

4103 ZYMOGENS OF PROTEOLYTIC ENZYMES. *(E.)* Kassell, B.; Kay, J. (Dept. Biochem., Med. Coll. Wisconsin, Milwaukee). *Science* 180(4090):1022-1027, 1973.

4104 ROLE OF CHOLINERGIC SYSTEM IN THE CONTROL OF PANCREATIC SECRETION. *(E.)* Konturek, S.; Tasler, J.; Obtulowicz, W. (Med. Acad., Krakow, Poland). *Acta Physiol. Pol.* 23(2):229-247, 1972.

4105 EXTERNAL SECRETION OF THE LIVER IN EXPERIMENTAL PANCREATIC TRAUMA AND PASSAGE OF PANCREATIC JUICE INTO THE PERITONEAL CAVITY. *(Rus.)* Vasilevskaia, L. S.; Vasil'eva, E. N. (Inst. Nutr., Moscow, USSR). *Patol. Fiziol. Eksp. Ter.* (3):44-47, 1972.

4106 THE ROLE OF PANCREATIC ENZYMES IN DIGESTION. *(E.)* Beck, I. T. (Hotel Dieu Hosp., Kingston, Canada). *Am. J. Clin. Nutr.* 26(3):311-325, 1973.

4107 THE SECRETION OF ELECTROLYTES BY THE PANCREAS. *(E.)* Scratcherd, T.; Case, R. M. (Sch. Med., Leicester Univ., England). *Am. J. Clin. Nutr.* 26(3):326-339, 1973.

4108 THE ROLE OF PANCREATIC EXOCRINE SECRETIONS IN THE ABSORPTION OF VITAMIN B_{12} AND IRON. *(E.)* Berstein, L.; Herbert, V. (Montefiore Hosp., New York, N.Y.). *Am. J. Clin. Nutr.* 26(3):340-346, 1973.

4109 THE NEUROHUMORAL CONTROL OF PANCREATIC EXOCRINE SECRETION. *(E.)* Brooks, F. P. (Univ. Pennsylvania Med. Sch., Philadelphia). *Am. J. Clin. Nutr.* 26(3):291-310, 1973.

4110 HISTOPATHOLOGIC CHANGES IN THE ALLOGRAFTED CANINE PANCREAS. *(E.)* Acosta, J. M.; Nardi, G. L.; Reeves, G.; Pinn, V.; Buceta, J. C.; Soloaga, J. C. (Dr. J. M. M. Fernandez Hosp., Fac. Med. Sci., Natl. Univ. Rosario, Granadero Baigorria, Argentina). *Arch. Surg.* 106(6):844-847, 1973.

4111 THE EFFECTS OF PENTOLINIUM AND VAGOTOMY ON THE INHIBITION OF CANINE EXOCRINE PANCREATIC SECRETION BY INTRAVENOUS ETHANOL. *(E.)* Tiscornia, O. M.; Hage, G.; Palasciano, G.; Brasca, A. P.; Brasca, A. P.; Devaux, M. A.; Sarles, H. (Unit. Res. Dig. Dis., INSERM, Marseille, France). *Biomedicine* 18(2):159-163, 1973.

4112 CONCURRENT STUDIES ON THE FLOW OF DIGESTA IN THE DUODENUM AND OF EXOCRINE PANCREATIC SECRETION OF CALVES: THE COLLECTION OF THE EXOCRINE PANCREATIC SECRETION FROM A DUODENAL CANNULA. *(E.)* Ternouth, J. H.; Buttle, H. L. (Natl. Inst. Res. Dairying, Shinfield, Reading, England). *Br. J. Nutr.* 29(3):387-397, 1973.

4113 RESPONSE OF THE RAT EXOCRINE PANCREAS TO SECRETIN AND CHOLECYSTOKININ-PANCREOZYMIN. *(E.)* Shaw, H. M.; Heath, T. J.; Stark, A. E. (Sch. Physiol. Pharmacol., Univ. New South Wales, Kensington, Australia). *Can. J. Physiol. Pharmacol.* 51(5):383-389, 1973.

See also, 3932, 4057, 4635, 4642, 4657, 4912.

Hepatobiliary Tract

4114 DISTAL ILEAL RESECTION: BILE ACID METABOLISM AND DIARRHEA. *(E.)* Kelly, T. R.; Klein, R. L. (Akron City Hosp., Ohio). *Am. Surg.* 39(5):305-308, 1973.

The effect of surgery and cholestyramine feeding on the diarrhea of 40 dogs with distal ileal resection was studied. The extent of distal ileal resection ranged from 10% to 30%. Neither resection of the ascending colon (to prevent the bile acids from inhibiting water and electrolyte absorption in the colon), cholecystectomy (to prevent a concentrated bile acid load from reaching the colon), nor cholestyramine feeding of 2-16 g/day for 2 weeks (to sequester bile acids and prevent their action on the colon) had any beneficial effect on the diarrhea caused by interrupting the enterohepatic circulation of bile salts. Diarrhea actually worsened in 30% of the 10-20% ileal-resected and 50% of the 30% ileal-resected animals after the ascending colon was resected. The increased absorptive surface and storage capacity of the right colon is more important, relative to the diarrhea, than is the bile acid effect on colonic water and electrolyte transport. Ascending colon resection results in loss of the ileocecal valve and removes any possibility of functional adaptation by the residual gut which sometimes occurs after ileal resection. Even though the gallbladder has been removed, continual discharge of hepatic bile into the small intestine and subsequently into the right colon negates any benefit cholecystectomy might have provided. Cholestyramine is probably of clinical value only when a relatively limited ileal resection has been performed.

4115 SYNCHRONIZATION OF HEPATIC CHOLESTEROL SYNTHESIS, CHOLESTEROL AND BILE ACID CONTENT, FATTY ACID SYNTHESIS AND PLASMA FREE FATTY ACID LEVELS IN THE FED AND FASTED RAT. *(E.)* Bortz, W. M.; Steele, L. A. (Lankenau Hosp., Philadelphia, Pa.). *Biochem. Biophys. Acta* 306(1):85-94, 1973.

It was confirmed that hepatic cholesterol synthesis exhibits circadian variation in the fed and fasted rat. Additionally, diurnal determinations were made of hepatic cholesterol and bile acid content, fatty acid synthesis, and plasma free fatty acid levels. Rhythmic variations occurred in all these parameters. Hepatic cholesterol and bile acid content rose through the early evening, the cholesterol peaking at midnight and the bile acids at 9 p.m. The ratio of maximum to minimum cholesterol synthesis in fed animals was 4:1. Both cholesterol and bile acid contents were higher in the fasted animal. There was a predominance of cholic acid and no significant differences in types of bile acids occurred throughout the day. The percentage of hyodeoxycholic acid rose from 5.0% in the fed to 12.0% in the fasted rats. Plasma free fatty acid was rather stable throughout the day except for a peak at 3 and 6 p.m. in the fed animal; values were much higher in the fasted animal. Hepatic fatty acid synthesis also exhibited a daily rhythm which was inversely proportional to the free fatty acid levels. It is suggested that the rise in plasma free fatty acid may be the signal for the increase in the amount of β-hydroxy-β-methyl-glutaryl-CoA reductase, and that the bile acids may repress its further synthesis.

4116 ABSENCE OF ETHANOL METABOLISM IN 'ACATALATIC' HEPATIC MICROSOMES THAT OXIDIZE DRUGS. *(E.)* Vatsis, K. P.; Schulman, M. P. (Univ. Illinois Coll. Med., Chicago). *Biochem. Biophys. Res. Commun.* 52(2):588-594, 1973.

When liver slices of Cs^a mice (a genetic control strain) and Cs^b mice (an acatalasemic strain) were incubated *in vitro*, they had similar catalase activities and equal rates of ethanol metabolism. While incubated liver homogenates and microsomes from Cs^a mice oxidized ethanol and retained catalase activity, preparations from Cs^b mice did not oxidize ethanol and lost all catalase activity. Addition of beef liver catalase restored ethanol oxidation by Cs^b microsomes. The oxidation of aniline and aminopyrine (both 0.1 mM) proceeded at the same rate in Cs^a and Cs^b microsomes and was inhibited by ethanol. No inhibition occurred at the higher level of 16 mM aniline and 16 mM aminopyrine. The drug-metabolizing capacity of Cs^a and Cs^b livers was not altered by preincubating microsomes for 1 hr at 37°C before drug addition. It is evident that (a) the microsomal drug-metabolizing pathway is not involved in ethanol oxidation and (b) the postulation of a unique microsomal ethanol-oxidizing system that is independent of microsomal catalase is unwarranted.

4117 ETHANOL-INDUCED FATTY LIVER: EFFECT OF INTESTINAL LYMPH FISTULA. *(E.)* Ockner, R. K.; Mistilis, S. P.; Poppenhausen, R. B.; Stiehl, A. F. (Univ. Calif., Sch. Med., San Francisco). *Gastroenterology* 64(4):603-609, 1973.

Intraduodenal ethanol enhancement of the production of nondietary, very low density lipoprotein by rat intestine was examined with regard to its possible contribution to ethanol-induced fatty liver. Rats received constant intraduodenal infusions of ethanol (5 g/kg) or isocaloric glucose during the 0 to 8-hr interval. In glucose-infused animals the hepatic triglyceride concentration at 24 hr was not changed by diversion of intestinal lymph and was similar to controls in both fistula and nonfistula rats. After ethanol, rats without lymph fistulae developed the expected fatty liver at 24 hr. In marked contrast, fistula rats had virtually normal liver triglycerides at this time. The effect of lymph diversion was not due to lipid losses prior to ethanol, for a corresponding reduction in the ethanol dose (i.e., 4.5 g/kg) still induced fatty livers in rats without fistulae, nor was the effect of lymph diversion due to minor lymphatic losses of ethanol during the experiment. A similar effect was present at 16 hr in some rats, but not in others. The basis for the variable response at this time was not elucidated, but correlated with plasma free fatty acid concentration. Nondietary intestinal lipoproteins do not seem quantitatively sufficient, by themselves, to account for the ethanol-induced fatty liver. However, they play an important role in the over-all lipid balance of the rat, and may contribute, with other endogenous sources, to hepatic lipid accumulation in this disorder.

4118 PRIMATE BILIARY PHYSIOLOGY X. EFFECTS OF DIET AND FASTING ON BILIARY LIPID SECRETION AND RELATIVE COMPOSITION AND BILE SALT METABOLISM IN THE RHESUS MONKEY. *(E.)*

Redinger, R. N.; Hermann, A. H.; Small, D. M. (Boston Univ. Sch. Med., Mass.). *Gastroenterology* 64(4):610-621, 1973.

The effects of long and medium chain triglyceride supplements, a fat-free diet, and fasting were studied in rhesus monkeys with biliary and duodenal fistulae, and the effects on biliary lipid and bile salt metabolism during steady state conditions were compared to prediet control periods. Administration of the long chain triglycerides, safflower oil (trilinolein) and triolein, as 20% isocalcoric substitutes for normal monkey chow increased bile flow, biliary phospholipid and cholesterol secretion, bile salt secretion, and the bile salt pool size but did not change the relative composition of the bile. When tricaprylin, a medium chain triglyceride, was administered as a 20% isocaloric substitute for normal monkey chow, decreases occurred in bile salt synthesis, bile salt pool size, and biliary cholesterol secretion. A fat-free diet (with sucrose substituted for fat) and fasting (only water and vitamins for 5-7 days) also decreased bile salt secretion and the bile salt pool size. While the fat-free diet had no other significant effects, fasting decreased bile flow and the secretion of all biliary lipids, but increased the relative proportion of cholesterol in bile. Starvation changed all parameters of bile salt metabolism adversely and came closest of all experiments in producing bile saturated with cholesterol. Tricaprylin was the only diet which improved the cholesterol-holding capacity of bile.

4119 INHIBITION OF BILE SALT-INDEPENDENT BILE FORMATION BY INDOCYANINE GREEN. *(E.)*

Horak, W.; Grabner, G.; Paumgartner, G. (Dept. Gastroenterol., Univ. Vienna, Austria). *Gastroenterology* 64(5):1005-1012, 1973.

The effects of constant infusion of indocyanine green at rates of 10, 40, or 80 nanomols/min/100g i.v. for 70 min on bile flow and bile salt excretion were investigated in male Wistar rats with a bile fistula. Sodium taurocholate (150 nanomols/min/100g i.v.) was infused at a constant rate to compensate for the bile salt loss during interruption of the enterohepatic circulation. Indocyanine green administration at rates exceeding the maximal hepatic transport capacity significantly decreased bile flow, mainly due to inhibition of the bile salt-independent fraction of bile. Competitive inhibition of bile salt transport played a minor role only, and indocyanine green had no effect on the osmotic activity of bile salts. After infusion of 40 and 80 nanomols/min/100g of indocyanine green, the bile salt-independent fraction decreased 32% and 68%, resp., while the bile salt-dependent fraction decreased 7% and 12%, resp. A significant linear correlation was found between the logarithm of the hepatic indocyanine green concentration and the decrease of the bile salt-independent fraction. It is suggested that the anticholeretic effect of indocyanine green and that of other organic anions depends on the specific inhibitory potency and the intracellular concentration of the substance reached under the different experimental conditions.

4120 TRIKETOCHOLANOIC (DEHYDROCHOLIC) ACID. HEPATIC METABOLISM AND EFFECT ON BILE FLOW AND BILIARY LIPID SECRETION IN MAN. *(E.)*

Soloway, R. D.; Hofmann, A. F.; Thomas, P. J.; Schoenfield, L. J.; Klein, P. D. (Mayo Clin., Rochester, Minn.). *J. Clin. Invest.* 52(3):715-723, 1973.

[24-^{14}C]Dehydrocholic acid (triketo-5β-cholanoic acid) was synthesized from [24-^{14}C]cholic acid, mixed with 200 mg of carrier, and administered i.v. to 2 female patients with indwelling T-tubes designed to permit bile sampling without interruption of the enterohepatic circulation. More than 80% of infused radioactivity was excreted rapidly in bile as glycine- and taurine-conjugated bile acids. After deconjugation, radioactive products were identified as partially or completely reduced derivatives of dehydrocholic acid. Mass spectrometry and chromatography demonstrated that the major metabolite (about 70%) was a dihydroxy monoketo bile acid (3α,7α-dihydroxy-12-keto-5β-cholanoic acid); a second metabolite (about 20%) was a monohydroxy diketo acid (3α-hydroxy-7,12-diketo-5β-cholanoic acid); and about 10% of radioactivity was present as cholic acid. Reduction appeared to have been sequential (3 position, then 7 position, and then 12 position) and stereospecific (only α epimers were recovered). Dehydrocholic acid increased bile flow, expressed as the ratio of bile flow to bile acid excretion. The hydroxy keto metabolites may be hydrocholeretics. The proportion of cholesterol to lecithin and bile acids did not change significantly after dehydrocholic acid administration. The hydroxy keto metabolites dispersed lecithin poorly compared to cholate in *in vitro* studies. However, mixtures of cholate and either metabolite had dispersant properties similar to those of cholate alone, provided the ratio of metabolite to cholate remained below a value characteristic for each metabolite. These experiments disclose a new metabolic pathway in man, provide further insight into the hydrocholeresis induced by keto bile acids, and indicate the striking change in pharmacologic and physical properties caused by replacement of a hydroxyl by a keto substituent in the bile acid molecule.

4121 INTESTINAL DEVELOPMENT OF LYSOSOMAL AND MICROSOMAL BETA GLUCURONIDASE AND BILIRUBIN URIDINE DIPHOSPHOGLUCURONYL TRANSFERASE IN NORMAL AND JAUNDICED RATS.

(E.) Kendall, S. R.; Thaler, M. M.; Erickson, R. P. (Dept. Pediatr., Univ. California, San Francisco). *J. Pediatr.* 82(6):1013-1019, 1973.

The perinatal development of an enzyme which catalyzes the deconjugation of bilirubin glucuronide (β-glucuronidase) differs from that of the enzyme which conjugates bilirubin (uridine diphosphate-glucuronyl transferase) in the intestine of Long-Evans and Gunn rats. Before birth, β-glucuronidase activity is relatively high, while transferase activity is barely detectable. During the first 4 days after birth, β-glucuronidase reaches a level nearly 7 times that of adult activity, whereas glucuronyl transferase approximates adult activity. β-Glucuronidase is present in lysosomes and microsomes. Lysosomal activity predominates during the perinatal period; microsomal activity develops more gradually, mainly in the distal intestine. On the 15th day β-glucuronidase peaks at 12 times the adult level; this level declines to normal at 25 days and even distribution of activity throughout the small intestine results. Therefore, the intestinal phase of pigment transport may contribute significantly to neonatal hyperbilirubinemia. Both activities decline during the third postnatal week. Neither weaning nor conjugated bilirubin appear to influence the development of deconjugating activity. In contrast, the conjugating process may be inducible by deconjugated bilirubin. These findings provide evidence that the capacity of the newborn intestine for conversion of conjugated bilirubin to free bilirubin greatly exceeds the capacity for conjugating the pigment. These conditions favor active intestinal reabsorption of bilirubin after birth.

4122 MECHANISM OF CHOLESTASIS. VII. α-NAPHTHYLISOTHIOCYANATE-INDUCED JAUNDICE.

(E.) Schaffner, F.; Scharnbeck, H. H.; Hutterer, F.; Denk, H.; Greim, H. A.; Popper, H. (Mount Sinai Sch. Med., New York, N.Y.). *Lab. Invest.* 28(3): 321-331, 1973.

The amount and activity of the enzymes of the hepatic microsomal biotransformation system, particularly directed to substrates bound to the heme ligand, were reduced by a single dose of α-naphthylisothiocyanate (100 mg/kg) given to 15 rats by stomach tube. The drop in cytochrome P-450 was associated with and probably accounted for, an early rise in serum bilirubin. Later, hepatocytic injury involving mitochondrial and plasma membranes, regurgitation of bile from injured bile ducts, and peripheral cholestasis associated with peripheral necrosis and destruction of ducts sustained the rise in bilirubin. Thus elevation of direct reacting serum bilirubin is the result of multiple factors acting at different times. Smooth endoplasmic reticulum hypertrophied, possibly as a response to α-naphthylisothiocyanate or to cholestasis. By 2 days the total concentration of bile acids increased 4-fold, but only cholic and β-muricholic acids were present in large amounts. The former had increased 3-fold; the latter, 20-fold. This indicates that formation of dihydroxy chenodeoxycholic and ursodeoxycholic acids was blocked. α-Naphthylisothiocyanate intoxication is not comparable as a model to cholestasis produced by biliary obstruction, but it may prove useful in studies of bile acid metabolism.

4123 ETHANOL INCREASES GLYCOSYL TRANSFERASE ACTIVITY IN THE HEPATIC GOLGI APPARATUS.

(E.) Gang, H.; Lieber, C. S.; Rubin, E. (Mt. Sinai Sch. Med., New York, N.Y.). *Nature (New Biol.)* 243(125):123-125, 1973.

The activity of uridine diphosphate (UDP)-galactosyl transferase increased significantly in male Sprague-Dawley rats 16 hr after administration of a single dose of ethanol (6 g/kg via gastric intubation). Measurement of the activity of UDP galactose:N-acetylglucosamine galactosyl transferase in partially purified Golgi fractions showed that the rate of hydrolysis to transferase activity was about 0.3. Total UDP-galactosyl transferase activity almost doubled when calculated as U/mg total protein. The increase was 75% when calculated as total protein/g liver or as total liver/100 g body weight. UDP-galactosyltransferase activity increased similarly with chronic ethanol administration (isocaloric replacement of 36% of total calories with ethanol). Acute and chronic ethanol administration also changed the UDP-galactosyl transferase distribution in the density gradient. It is unclear whether increased total UDP-galactosyl transferase activity results from an increase in the specific activity of Golgi membranes or from an increase in the total amount of these membranes. Enhanced secretion of lipoproteins after ethanol administration may be regarded as an adaptive escape mechanism by which the liver disposes of some of the excess lipids which accumulate in the cytoplasm. This is the first demonstration of the induction of enzyme activity in the Golgi apparatus with either a hexosamine or a protein as an acceptor for the transferase.

4124 PARADOXICAL EFFECTS OF PYRAZOLE ON ACUTE ETHANOL-INDUCED FATTY LIVER. *(E.)*

Nordmann, R.; Ribiere, C.; Rouach, H.; Nordmann, J. (Salpetriere Hosp., Paris, France). *Rev. Eur. Etud. Clin. Biol.* 17(6):592-596, 1972.

The effects of pyrazole administration on acute ethanol-induced fatty liver have been studied in Wistar rats using various experimental conditions. The pyrazole dose (272 mg/kg to 360 mg/kg), the time interval between pyrazole and ethanol administration (10-20 min), and the sex of the animals do not influence the results; these results depend on the administered ethanol dose. Pyrazole does not prevent the fatty liver induced by the intubation of ethanol in a dose of 4 g/kg but it prevents hepatic triglyceride accumulation when the intubated dose of ethanol is increased to 6 g/kg. However, pyrazole inhibits in both cases the decrease of the NAD$^+$/NADH ratio induced in the liver by ethanol metabolism. These results indicate that the accumulation of liver triglycerides is due to ethanol *per se* when ethanol is administered in a dose of 4 g/kg, but it is associated with ethanol metabolism when the administered ethanol dose is larger.

4125 RELATIONSHIP OF HEPATIC TRACE METALS TO INTESTINAL TRANSPORT IN CHOLINE-DEFICIENT RATS. *(E.)* Keefer, R. C.; Tuma, D. J.; Barak, A. J. (VA Hosp., Omaha, Neb.). *Am. J. Clin. Nutr.* 26(4):409-414, 1973.

4126 CHOLANGIOGRAPHIC EXCRETION STUDIES: IODIPAMIDE AND IOGLYCAMIC ACID COMPARISON. *(E.)* Benness, G. T.; Soschko, M. (no affil.). *Australas. Radiol.* 16(4):383-384, 1972.

4127 EFFECT OF PROTEIN DEFICIENCY ON THE INDUCIBILITY OF THE HEPATIC MICROSOMAL DRUG-METABOLIZING ENZYME SYSTEM. I. EFFECT OF SUBSTRATE INTERACTION WITH CYTOCHROME P-450. *(E.)* Hayes, J. R.; Mgbodile, M. U. K.; Campbell, T. C. (Virginia Polytechnic Inst. State Univ., Blacksburg). *Biochem. Pharmacol.* 22(9):1005-1014, 1973.

4128 RENIN ACTIVITY IN CANINE ACUTE HEPATIC NECROSIS AND CHRONIC TOXIC HEPATITIS. *(E.)* Tapia, H. R.; Kuster, G. G. R.; Woods, J. E.; Strong, C. G. (Mayo Clin., Rochester, Minn.). *Can. J. Physiol. Pharmacol.* 51(5):360-365, 1972.

4129 CIRCADIAN RHYTHM OF DIFFERENT RNA FRACTIONS IN RAT LIVER AND THE EFFECT OF CYCLOHEXIMIDE. *(E.)* Doring, R.; Rensing, L. (1st Zool. Inst., Univ. Gottingen, Germany). *Comp. Biochem. Physiol. (B)* 45:285-290, 1973.

4130 CHOLESTANOL AND CHENODEOXYCHOLIC ACID: METABOLITES OF INJECTED CHOLESTEROL-4-^{14}C IN PIGEON BILE. *(E.)* Subbiah, M. T. R. (Mayo Clin., Rochester, Minn.). *Experientia* 29(4):404-405, 1973.

4131 EFFECT OF EXPERIMENTAL HEPATIC INJURY ON THE CLEARANCE OF PHENOBARBITAL AND PARALDEHYDE. *(E.)* Breen, K. J.; Shaw, J.; Alvin, J.; Henderson, G. I.; Hoyumpa, Jr., A. M.; Schenker, S. (Vanderbilt Univ. Med. Sch., Nashville, Tenn.). *Gastroenterology* 64(5):992-1004, 1973.

4132 THE FINE STRUCTURE, POTASSIUM CONTENT, AND RESPIRATORY ACTIVITY OF ISOLATED RAT LIVER PARENCHYMAL CELLS PREPARED BY IMPROVED ENZYMATIC TECHNIQUES. *(E.)* Howard, R. B.; Lee, J. C.; Pesch, L. A. (Sch. Med., State Univ. New York, Buffalo). *J. Cell Biol.* 57(3):642-658, 1973.

4133 ANALYSIS OF RANDOMIZED BILIARY DRAINAGE FOR LIVER TRAUMA IN 189 PATIENTS. *(E.)* Lucas, C. E.; Walt, A. J. (Wayne State Univ. Sch. Med., Detroit, Mich.). *J. Trauma* 12(11):925-930, 1972.

4134 A NEW METHOD FOR THE METABOLIC INVESTIGATION OF A CHOLERETIC AGENT. *(E.)* Pinelli, A. (Dept. Pharmacol., Univ. Milan, Italy). *Pharmacol. Res. Commun.* 5(1):17-23, 1973.

4135 EQUIVALENT PLASMA VOLUME OF BILE. *(E.)* Mikulecky, M. (Fac. Med., Comenius Univ., Bratislava, Czechoslovakia). *Physiol. Bohemoslov.* 21(3):323-327, 1972.

4136 STUDIES ON THE MECHANISM OF CYSTAMINE PREVENTION OF SEVERAL LIVER STRUCTURAL AND BIOCHEMICAL ALTERATIONS CAUSED BY CARBON TETRACHLORIDE. *(E.)* Castro, J. A.; de Ferreyra, E. C.; de Castro, C. R.; Diaz Gomez, M. I.; D'Acosta, N.; de Fenos, O. M. (Lab. Biotoxicol. Chem., CITEFA, Zufriategui y Varela-Villa Martelli, Buenos Aires Prov., Argentina). *Toxicol. Appl. Pharmacol.* 24(1):1-19, 1973.

4137 COMPARISON OF THE TOXICITY OF CHEMICALS IN NEWBORN RATS TO BILE DUCT-LIGATED AND SHAM-OPERATED RATS AND MICE. *(E.)* Klaassen, C. D. (Univ. Kansas Med. Ctr., Kansas City). *Toxicol. Appl. Pharmacol.* 24(1):37-44, 1973.

4138 THE EFFECT OF PROTEIN QUALITY AND ASCORBIC ACID DEFICIENCY ON STIMULATION OF HEPATIC MICROSOMAL ENZYMES IN GUINEA PIGS. *(E.)* Chadwick, R.; Peoples, A.; Cranmer, M. (Environmental Protection Agency, Perrin Primate Lab., Fla.). *Toxicol. Appl. Pharmacol.* 24(4):603-611, 1973.

4139 THE EFFECT OF PARTIAL HEPATECTOMY ON THE TOXICITY OF ETHYLENE GLYCOL, GLYCOLIC ACID, GLYOXYLIC ACID AND GLYCINE. *(E.)* Richardson, K. E. (Dept. Physiol. Chem., Ohio State Univ., Columbus). *Toxicol. Appl. Pharmacol.* 24(4):530-538, 1973.

4140 DELAYED IN VIVO HEPATIC POST-MORTEM AUTOLYSIS. *(E.)* Nunley, W. C.; Schuit, K. E.; Dickie, M. W.; Kinlaw, J. B.

(Sch. Med., Univ. Virginia, Charlottesville). *Virchows Arch. (Zellpathol.).* 11(4):289-302, 1972.

4141 THE PARS DISTALIS OF THE PITUITARY AS A SOURCE OF LIVER GROWTH STIMULATING FACTORS DURING LIVER REGENERATION. *(E.)* Badran, A. F.; Echave Llanos, J. M.; Surur, J. M. (Fac. Med. Sci., Natl. Univ., La Plata, Argentina). *Virchows Arch (Zellpathol.)* 13(1):79-85, 1973.

4142 EFFECT OF ANTIDIURETIC HORMONE ON THE DISAPPEARANCE OF EXOGENOUS BILIRUBIN IN THE PLASMA. *(E.)* Lechin, F.; van der Dijs, B.; Bentolila, A.; Pena, F. (Central Univ. Venezuela, Sch. Med., Caracas). *Acta Gastroenterol. Latinoam.* 4(4):147-152, 1972.

4143 THE EFFECT OF NORADRENALINE AND ADRENALINE ON HEPATOSPLANCHNIC HEMODYNAMICS, FUNCTIONAL CAPACITY OF THE LIVER AND HEPATIC METABOLISM. *(E.)* Krarup, N. (Inst. Physiol., Univ. Aarhus, Denmark). *Acta Physiol. Scand.* 87(3):307-319, 1973.

4144 STUDIES ON THE REGENERATIVE CAPACITY OF THE LIVER IN RATS SUBJECTED TO PARTIAL HEPATECTOMY AND TREATED WITH SILYMARIN. *(E.)* Magliulo, E.; Carosi, P. G.; Minoli, L.; Gorini, S. (Clin. Inst. Infect. Dis., Univ. Pavia, Italy). *Arzneim. Forsch.* 23(1):161-168, 1973.

4145 EFFECTS OF PHENOXYBENZAMINE ON EARLY STAGES OF LIVER REGENERATION IN PARTIALLY HEPATECTOMIZED RATS. *(E.)* Thrower, S.; Ord, M. G.; Stocken, L. (Dept. Biochem., Univ. Oxford, England). *Biochem. Pharmacol.* 22(1):95-100, 1973.

4146 GENTAMYCIN LEVELS IN THE HUMAN BILIARY TRACT. *(E.)* Pitt, H. A.; Roberts, R. B.; Johnson, Jr., W. D. (New York Hosp.-Cornell Med. Ctr., N.Y.). *J. Infect. Dis.* 127(3):299-302, 1973.

4147 RELATIONSHIP OF ALCOHOL METABOLISM TO THE POTENTIATION OF CCl_4 HEPATOTOXICITY INDUCED BY ALIPHATIC ALCOHOLS. *(E.)* Traiger, G. J.; Plaa, G. L. (Fac. Med., Univ. Montreal, Canada). *J. Pharmacol. Exp. Ther.* 183(3):481-488, 1972.

4148 AUXILIARY LIVER PERFUSION IN THE PIG. EFFECT OF ISCHAEMICALLY DAMAGED LIVERS ON RECIPIENT ANIMALS. *(E.)* Cuschieri, A.; Baker, P. R.; Shields, R. (Dept. Surg., Univ. Liverpool, England). *J. Surg. Res.* 13:188-196, 1972.

4149 THE EFFECT OF HEPATECTOMY ON BODY WATER DISTRIBUTION. *(E.)* Freeman, J. B.; Shizgal, H. M.; Slapack, M.; Gutelius, J. R. (Roy. Victoria Hosp., Montreal, Canada). *J. Surg. Res.* 14(1):31-35, 1973.

4150 INFLUENCE OF THEOPHYLLINE ON BILE FORMATION IN THE DOG. *(E.)* Erlinger, S.; Dumont, M. (Beaujon Hosp., Clichy, France). *Biomedicine* 19(1):27-32, 1973.

4151 INDUCTION OF DRUG METABOLIZING ENZYME SYSTEM IN THE LIVER. *(E.)* Remmer, H. (Toxicol. Inst., Univ. Tubingen, Germany). *Eur. J. Clin. Pharmacol.* 5(2):116-136, 1972.

4152 ACID-CATALYZED ADDITION OF ALCOHOLS AND THIOLS TO BILIRUBIN. *(E.)* Manitto, P.; Monti, D. (Inst. Organic Chem., Fac. Sci. Univ. Milan, Italy). *Experientia* 29(2):137-139, 1973.

4153 EFFECT OF PENTAGASTRIN ON CANINE BILE FLOW. *(E.)* Kaminski, D. L.; Rose, R. C.; Nahrwold, D. L. (Pennsylvania State Univ., Coll. Med., Hershey). *Gastroenterology* 64(4):630-633, 1973.

4154 THE INFLUENCE OF DIETARY COPPER CONCENTRATION ON HEPATIC COPPER IN THE DUCKLING AND THE CHICK. *(E.)* Wood, E. C.; Worden, A. N. (Huntingdon Res. Ctr., England). *J. Sci. Food Agric.* 24(2):167-174, 1973.

4155 EFFECTS OF PARTIAL HEPATECTOMY ON THE BEHAVIOR OF SOME LIVER AND RENAL ENZYMES CONNECTED WITH THE KREBS-HENSELEIT CYCLE. *(It.)* Gulla, P.; Trancanelli, V. (Inst. Spec. Surg. Pathol. Clin. Propedeutics, Univ. Perugia, Italy). *Acta Chir. Ital.* 27(4):249-259, 1971.

See also, 4057, 4094, 4105, 4373, 4785, 4793.

Intestine

4156 COMPLEX LIPID SYNTHESIS IN HAMSTER INTESTINE. *(E.)* Mansbach, II, C. M. (Duke Univ. Med. Ctr., Durham, N.C.). *Biochim. Biophys. Acta* 296(2):386-402, 1973.

Diglyceride acyltransferase, cholinephosphotransferase, and lysolecithin acyltransferase were studied in non-fasting hamster intestinal mucosa. The specific activities of diglyceride acyltransferase and lysolecithin acyltransferase were greatest in the proximal intestine in villous tips correlating with the physiological and morphological site of lipid absorption. The proximal segment had 5 times the diglyceride acyltransferase activity of the most distal segment. The activity of diglyceride acyltransferase in villous tips was 4-6 times greater than in their respective crypts in the most proximal segment. The proximal segment had 4 times the lysolecithin acyltransferase activity of the most distal segment. The specific activity of cholinephosphotransferase did not vary either between tip and crypt preparations or in the proximal as compared to the distal intestine. When comparison was made between the 2 pathways of lecithin synthesis studied, the specific activity of lysolecithin acyltransferase was 2-3 times greater than cholinephosphotransferase in villous tips; no difference was observed in crypts. The findings suggest that, in villous tips, lecithin is predominately synthesized via the lysolecithin acyltransferase pathway and that it is this pathway which provides the lecithin associated with intestinal triglyceride transport. Competition for the common substrate, diglyceride, in villous tips was examined by determining the specific activities of diglyceride acyltransferase and cholinephosphotransferase using either an aqueous dispersion of diglyceride or microsomal membrane bound diglyceride synthesized from glycerol 3-phosphate. In each instance, triglyceride was the predominant reaction product suggesting that diglyceride, in villous tips, is chiefly distributed into the triglyceride synthetic pathway.

4157 GLUCONEOGENESIS IN JEJUNAL MUCOSA OF GUINEA PIG. *(E.)* Anderson, J. W.; Rosendall, A. F. (VA Hosp., San Francisco, Calif.). *Biochim. Biophys. Acta* 304(2):384-388, 1973.

Jejunal mucosa of the guinea pig contains significant activities for the important, rate-limiting enzymes of gluconeogeneses. Glucose-6-phosphatase activity in jejunal mucosa was 31% of the activity observed for the liver. That for fructosediphosphatase was 46%; phosphopyruvate carboxykinase, 5%; and pyruvate carboxylase, 12%. The initial glucose content of jejunal mucosa from 72-hr starved guinea pigs was 1.0 μmol/g mucosa, while the glucose content in fed animals was 4 times higher. The rate of glucose production from endogenous substances was about 0.8 μmol/hr/g mucosa in both fed and fasted animals. Homogenates of jejunal mucosa from 72-hr starved guinea pigs had glucose production rates from malate of 4.8 μmol/hr/g mucosa. These studies suggest that intestinal mucosa may be an important source of glucose production in the starved guinea pig.

4158 THE PROPERTIES OF Na^+-DEPENDENT AND Na^+-INDEPENDENT LYSINE UPTAKE BY ISOLATED INTESTINAL EPITHELIAL CELLS. *(E.)* Reiser, S.; Christiansen, P. A. (Indiana Univ. Sch. Med., Indianapolis). *Biochim. Biophys. Acta* 307(1): 212-222, 1973.

The 5-min uptake of 1 mM leucine by epithelial cells isolated from rat intestine decreased 75% in the absence of extracellular Na^+; leucine did not attain intracellular concentrations greater than 1 mM. In contrast, the uptake of 1 mM lysine decreased only 32%; lysine reached an intracellular concentration of 1.54 mM, showing that a large component of the lysine uptake is Na^+ independent. The Na^+-independent component of lysine uptake attained levels significantly greater than unity after 5 min, but the total contribution of Na^+-independent lysine uptake decreased from 82 to 62% as the incubation time increased from 1 to 10 min. The Na^+-independent component of lysine uptake was significantly inhibited by dinitrophenol (0.4 mM) after 5 and 10 min, but not after 2 min. Ouabain (0.5 mM) was noninhibitory. These findings suggest a relatively slow dissipation of the processes involved in energizing Na^+-independent lysine uptake. At pH 9.0, Na^+-dependent lysine uptake increased while Na^+-independent lysine uptake decreased. At pH 3.5 lysine uptake in the presence and absence of Na^+ was reduced to the same level. Dinitrophenol, anaerobiosis, and ouabain specifically decreased the Na^+-dependent component of lysine uptake after 2 min. Ethacrynic acid (5 mM), N-ethylmaleimide (0.4 mM), ATP (2 mM), and arginine (5 mM) inhibited both the Na^+-dependent and Na^+-independent components of lysine uptake. Results indicate that optimal Na^+-dependent lysine uptake is possible for periods as long as 5 min at a relatively high pH. Isotonic replacement of K^+, Ca^{++}, and Mg^{++} by choline produced similar changes in the 2-min uptake of lysine in the presence or absence of Na^+.

4159 EXCHANGE TRANSPORT AND AMINO ACID CHARGE AS THE BASIS FOR Na^+-INDEPENDENT LYSINE UPTAKE BY ISOLATED INTESTINAL EPITHELIAL CELLS. *(E.)* Reiser, S.; Christiansen, P.A. (Indiana Univ. Sch. Med., Indianapolis). *Biochim. Biophys. Acta* 307(1): 223-233, 1973.

Dinitrophenol (0.4 mM), anaerobiosis, and ouabain (0.5 mM) did not inhibit the Na^+-independent stimulation of 1 mM lysine uptake by alanine in isolated epithelial cells from the rat. Ethacrynic acid (5 mM), N-ethylmaleimide (0.4 mM), ATP (2 mM),

rginine (5 mM), and incubation in the cold pro-
luced a wide range of inhibitions. These inhibitors
imilarly influenced Na$^+$-independent lysine uptake.
a$^+$-independent, alanine-stimulated lysine uptake
as independent of extracellular K$^+$ but was decreased
0-17% by the replacement of the Ca^{++} and/or Mg^{++}
f the incubation medium, thus producing a pattern
imilar to that observed with Na$^+$-independent lysine
ptake. The diverse effects of pH on the stimulation
f lysine uptake by alanine-preloaded cells very close-
y approximated that found for Na$^+$-independent lysine
ptake by non-preloaded cells. Thus, the properties
f alanine-stimulated lysine uptake are similar to
he properties of the Na$^+$-independent uptake of this
mino acid, suggesting that both systems are mediated
y the same or related transport processes. A study
f the relation between the net positive charge of
istidine and the magnitude of Na$^+$-dependent histi-
ine uptake revealed that this process was increased
y 17-24% at pH 4.5 where the cationic form of histi-
ine is the primary molecular species. However,
lanine-stimulated histidine uptake showed a 40%
ncrease at pH 4.5.

160 ON THE DISTRIBUTION OF ENTEROKINASE IN PORCINE INTESTINE AND ON ITS SUBCELLULAR OCALIZATION.

(E.) Louvard, D.; Maroux, S.; Baratti,
.; Desnuelle, P. (Biochemical Ctr., CNRS, Marseille,
rance). *Biochim. Biophys. Acta* 309(1):127-137,
973.

terokinase, which is responsible for the *in vivo*
ctivation of pancreatic zymogens, was exclusively
nthesized in the pig by the duodenal mucosa.
arge amounts of the free enzyme were also encoun-
ered in the ileal contents. In contrast, other
testinal enzymes, such as aminopeptidase and
lkaline phosphatase, were synthetized primarily
the mucosa of jejunum and ileum, thus demonstra-
ng a specialization at the enzyme level in the 3
gions of small intestine. Enterokinase did not
parate from aminopeptidase and alkaline phosphatase,
known markers of the brush border membrane, during
actionation steps yielding apparently pure prepa-
tions of closed membrane vesicles from duodenal
ush border. Enterokinase was removed very rapidly
om the vesicles by papain, but not by trypsin,
ymotrypsin, or subtilisin. These results confirm
at enterokinase is attached to the external side
the duodenal brush border membrane. No evidence
s obtained to support the hypothesis that entero-
nase flow along the intestine is synchronized with
ncreatic secretion.

61 INFLUENCE OF BILIARY STASIS ON THE ACTIVITY AND DISTRIBUTION OF MALTASE, SUCRASE, KALINE PHOSPHATASE, AND LEUCYLNAPHTHYLAMIDASE IN E SMALL INTESTINE OF THE MOUSE.

(E.) Cook, R.
; Powell, P. M.; Moog, F. (Dept. Biol., Washington
iv., St. Louis, Mo.). *Gastroenterology* 64(3):
1-420, 1973.

stribution of the activities of alkaline phospha-
se, leucylnaphthylamidase, sucrase, and maltase was measured in homogenates of small intestinal segments from SWR/J mice 72 hr after ligation of the common bile duct and in those from sham-operated mice. Sucrase and maltase activities increased in all segments of the small intestine, particularly in the mid-region, in mice with biliary stasis although bile duct ligation decreased the weight of the small intestine by 18.7% and total intestinal protein by 22.4%. Bile stasis decreased leucylnaphthylamidase activity slightly in the duodenum and jejunum and caused loss of the type of alkaline phosphatase (high phenylphosphate: β-glycerophosphate ratio) characteristic of the mouse duodenum, but increased the activity of this isoenzyme in the jejunum and ileum. These findings imply that enzyme activities in the normal intestine are regulated, at least in part, by secretions from the liver. Changes in the distribution of enzymes caused by biliary stasis are not likely to be due to general debility, surgical stress, changes in cell dynamics, or reduction in the size of duodenal villi. Possible explanations for increased disaccharidase activities include changes in intracellular metabolism or changes in the character of the surface membrane. Since activities were measured in whole homogenates, it is also possible that increases in disaccharidases may not be on the cell surface.

4162 ADDITIONAL STUDIES ON THE REGULATION OF CARBOHYDRATE-DEPENDENT ENZYMES IN THE JEJUNUM: CHANGES IN AMINO ACID POOLS, PROTEIN SYNTHESIS, AND THE EFFECT OF ACTINOMYCIN-D.

(E.) Grand, R. J.; Jaksina, S. (Harvard Med. Sch., Boston, Mass.). *Gastroenterology* 64(3):429-437, 1973.

A study was undertaken to determine whether carbohydrate-induced adaptive changes in rat jejunal disaccharidase levels were accompanied by changes in protein synthesis or were influenced by inhibition of RNA synthesis and cell migration. In rats fed a casein-rich, carbohydrate-free diet for 7 days, the size of the total amino acid pools was 50-100% larger than in rats fed the casein-rich diet for 7 days followed by a high sucrose, lower protein diet for 24 hr. No significant changes occurred in the proportions of individual amino acids in the pool. The specific radioactivity of the leucine pool increased when carbohydrate was added to the diet and protein intake reduced. Incorporation of radioactive precursors into homogenate and brush border proteins reflected the characteristics of the pools, and was therefore higher during carbohydrate feeding when the pool size was smaller. Diet had no effect on the rate of cell migration. Disaccharidase activities decreased during prolonged carbohydrate starvation. RNA synthesis decreased 50% and cell migration was arrested 18 hr after administration of actinomycin D (250 µg/g body weight i.p.). Actinomycin D did not inhibit the sucrose-stimulated increase in homogenate sucrase activity although it did abolish the expected increase in fructokinase activity. After actinomycin D treatment, brush border sucrase activity did not parallel increases in the homogenate but decreased significantly. These findings demonstrate that amino acid pools in the jejunum are closely regulated by the dietary protein intake, that dietary carbohydrate increases jejunal disaccharidase activity without accelerating the rate of protein synthesis, and that this effect is also independent of RNA synthesis and cell migration. In contrast, jejunal fructokinase activity is probably regulated at the level of transcription.

4163 INFLUENCE OF SECRETIN AND CHOLECYSTOKININ ON INTESTINAL ALKALINE PHOSPHATASE SECRETION. *(E.)*

Dyck, W. P.; Martin, G. A.; Ratliff, C. R. (Scott and White Clin., Temple, Tex.). *Gastroenterology* 64(4):599-602, 1973.

The i.v. administration of secretin (1 U/kg) and cholecystokinin (1 U/kg 30 min after secretin injection) in 38 human subjects (24 female and 14 male, aged 22-76 yr) was accompanied by an increase in the alkaline phosphatase activity in duodenal juice. Of the 38 subjects, 8 had undergone cholecystectomy. Mean output of alkaline phosphatase rose from 4.8 to 14.4 U/10 min during the first 10 min after secretin injection. Immediately after cholecystokinin, the mean enzyme output rose to 33.2 U/10 min. Cholecystectomized subjects exhibited responses similar to those in subjects without previous surgery. One subject, with a T-tube placed in the common bile duct, showed no significant increase in alkaline phosphatase concentration in hepatic bile after secretin and cholecystokinin injection, while the concentration of the enzyme in duodenal juice showed a marked increase after the injection of each hormone. Isoenzyme differentiation studies, based on different susceptibilities to inhibition by urea and L-phenylalanine, indicate an intestinal origin of the enzyme. Secretin and cholecystokinin may exert a direct effect on the release of alkaline phosphatase from the brush border membrane of the intestinal epithelial cell, or the observed enzyme release may be a secondary effect of an increase in the intraluminal content of bile salts and pancreatic enzymes.

4164 STIMULATION OF INTESTINAL MUCOSAL PROLIFERATION BY VITAMIN D. *(E.)*

Birge, S. J.; Alpers, D. H. (Washington Univ. Sch. Med., St. Louis, Mo.). *Gastroenterology* 64(5):977-982, 1973.

Intestinal mucosal cell turnover was studied in vitamin D-deficient rats 4 hr after a single dose of vitamin D_3 (100 U p.o.). ^{3}H-Thymidine incorporation into DNA was enhanced. The mucosal cell migration rate of vitamin D-repleted animals was 1.5 times that of the deficient animals. The accelerated mucosal cell turnover was associated with an increase of approximately 20% in villus height. Stimulation of DNA synthesis and villus height was greater in the duodenum than in the jejunum. This stimulation of mucosal cell proliferation preceded enhanced calcium transport and, therefore, may be an important component of action of vitamin D on the intestine. These observations suggest that vitamin D stimulation of calcium absorption may be mediated in part by new cell formation and cell differentiation in immature crypt cells.

4165 THE USE OF ISOLATED CELLS TO ASSESS THE CONTRIBUTION OF THE MUCOSAL EPITHELIUM TO THE METABOLISM OF THE INTESTINAL WALL. *(E.)*

Evans, E. M.; Burdett, K. (Dept. Med. Biochem., Univ. Manchester, England). *Gut* 14(2):98-103, 1973.

Suspensions of isolated cells were used to study the metabolism of the mucosal epithelium and to compare its activity with that of other tissues in the intestinal wall of guinea pig. Only 4% of the total glycolytic activity of the intestinal wall could be attributed to the mucosal epithelium. About 76% of the activity was located in the intestinal muscle and the remaining 20% in the subepithelial mucosal tissue. The glycolytic activity of isolated epithelial cells was stimulated by glucose or fructose with maximum glycolysis occurring at sugar concentrations of more than 10 mM. Clearly the view that the major proportion of the glycolytic activity of the small intestine resides in the mucosal epithelium does not apply to the guinea pig. It would therefore be prudent to re-examine any conclusions about the distribution of metabolic activity throughout the gut wall if the supporting evidence has been drawn from experiments with mucosal homogenates.

4166 INTESTINAL EPITHELIAL CELL SURFACE MEMBRANE GLYCOPROTEIN SYNTHESIS. I. AN INDICATOR OF CELLULAR DIFFERENTIATION. *(E.)*

Weiser, M. M. (Harvard Med. Sch., Boston, Mass.). *J. Biol. Chem.* 248(7):2536-2541, 1973.

Cell surface glycoproteins were examined with regard to the control and expression of cell turnover, differentiation, and malignant transformation in the rat intestinal epithelial cell. This cell is characterized by a rapid cell turnover and by a gradient of differentiation from crypt to villus. Epithelial cells were isolated from different levels of crypt and villus areas. When labeled D-glucosamine, L-fucose, or D-galactosamine were given i.p. to a rat, a sharp gradient of radioactive incorporation paralleled the specific activity gradients of sucrase and alkaline phosphatase. The upper villus cells incorporated much more D-[1-^{14}C]glucosamine than did crypt cells. Subcellular fractionation of the intestinal cells labeled *in vivo* demonstrated that the highest specific activity was in the purified microvillus plasma membranes and the lowest specific activity was in the microsomal and cytosol fractions. Sodium dodecyl sulfate-polyacrylamide gel electrophoresis of microvillus membranes showed peaks of D-[1-^{14}C]glucosamine incorporation which coincided with peaks of sucrase and alkaline phosphatase activities, and most of the bands which stained for protein also stained for glycoprotein. Microvillus core proteins separated on sodium dodecyl sulfate-polyacrylamide did not show peaks of D-[1-^{14}C]glucosamine incorporation and did not stain for glycoprotein. This suggests that the more differentiated upper villus cells incorporate more labeled sugar precursors into membrane glycoproteins than the less differentiated lower villus or crypt cells and that these membrane glycoproteins are associated with membrane-bound enzymes in the brush border.

4167 INTESTINAL EPITHELIAL CELL SURFACE MEMBRANE GLYCOPROTEIN SYNTHESIS. II. GLYCOSYLTRANSFERASES AND ENDOGENOUS ACCEPTORS OF THE UNDIFFERENTIATED CELL SURFACE MEMBRANE. *(E.)*

Weiser, M. M. (Harvard Med. Sch., Boston, Mass.). *J. Biol. Chem.* 248(7):2542-2548, 1973.

Cell surface membranes of mitotically active crypt cells from rat intestinal epithelium have glycosyl transferase activities and endogenous acceptors not found on differentiating villus cells. Intact rat intestinal epithelial cells were isolated from different levels of the villus and crypt areas representing sequential stages of cellular differentiation. Up to ten times as much uridine diphosphate (UDP)-N-acetyl[1-^{14}C]glucosamine, UDP-[U-^{14}C]glucose, UDP-[1-^{3}H]galactose, guanosine diphosphate (GDP)-[U-^{14}C]mannose, and GDP-[U-^{14}C] fucose was incorporated into the crypt cells as into the villus cells, with the highest incorporation rate in the bottom crypt cells. In contrast, cytidine monophosphate-[4,5,6,7,8,9-^{14}C]sialic acid was preferentially transferred to the villus rather than to the crypt cell surface. Effective transfer of sugars to exogenous acceptors also indicates that galactosyl transferase activity is present on crypt cells and that sialyl transferase activity occurs primarily on villus cells. Neither glycosyl transferase activities nor endogenous acceptors were released into the incubation medium. Analysis of labeled endogenous product suggested that most of the label was present as the original monosaccharide derived from the nucleotide sugar and that it had been incorporated into a membrane-associated glycoprotein. Galactosyl transferase activity to both an exogenous and an endogenous acceptor was found when human fetal intestinal epithelial cells were incubated with UDP-[1-^{3}H] galactose. These results suggest that the plasma membrane of the mitotically active undifferentiated crypt cell and fetal cell both contain active glycosyl transferase enzymes and acceptor sites which are glycoproteins with incomplete polysaccharide chains.

4168 CHANGES IN SUCRASE, ENTEROKINASE, AND PEPTIDE HYDROLASE AFTER INTESTINAL RESECTION. THE ASSOCIATION OF CELLULAR HYPERPLASIA AND ADAPTATION. *(E.)*

McCarthy, D. M.; Kim, Y. S. (VA Hosp., San Francisco, Calif.). *J. Clin. Invest.* 52(4):942-951, 1973.

Male Sprague-Dawley rats were sacrificed 4 weeks after removal of the proximal 2/3 of the small intestine. Changes in the mucosal levels of sucrase, enterokinase, and dipeptide hydrolase (L-leucyl-L-alanine substrate) were examined with regard to associated changes in protein, DNA, and wet mucosal weight. Metabolic studies showed that normal growth patterns were reestablished after the operation but significant elevations in stool weight and fecal nitrogen, though these did not correlate, occurred in the 2nd postoperative week and normalized by the 4th week. In standard gut segments wet weight of mucosa, protein, and DNA rose, especially in distal segments, with a disproportionate increase in DNA. Mucosal levels of the proximally distributed and membrane-bound enzymes, sucrase and enterokinase, showed similar patterns of change: when enzyme activity was expressed in terms of the total/segment, proximally there were considerable increases in both enzymes but, expressed in terms of specific activity, that of sucrase fell and that of enterokinase remained unchanged. In contrast, the largely soluble and more distally distributed dipeptide hydrolase increased more in distal segments, and increases in total activity were accompanied by smaller increases in specific activity. Despite increases in total activity, enzyme activity/mg DNA fell by over 50% in post-anastomotic segments. Subcellular distribution studies showed no change in the percentage of the total activity which was membrane-bound, and zymograms confirmed that no new dipeptide hydrolase had appeared after resection. It is concluded that increases in the segmental totals of various enzymes occurring after resection result from disproportionate increases in the number of mucosal cells/segment and that the greatest change in a particular enzyme occurs in the region where the enzyme is normally found in highest concentration.

4169 EFFECT OF ETHANOL ON INTESTINAL ADENOSINE TRIPHOSPHATE (ATP) CONTENT. *(E.)*

Carter, E. A.; Isselbacher, K. J. (Harvard Med. Sch., Boston, Mass.). *Proc. Soc. Exp. Biol. Med.* 142(4):1171-1173, 1973.

Incubation of segments from the guinea pig small intestine with 2.6% ethanol, an amount comparable to those found in the small intestine of moderate social drinkers, significantly decreased the ATP content of the intestine. Addition of pyrazole (1 mM) reduced oxidation of ethanol to CO$_2$ by 70% but did not block the effect of ethanol on the intestinal ATP content. Decreased ATP levels were also found in the small intestines of rats given a single dose of ethanol (7.5 g/kg via a stomach tube) or fed a high-alcohol liquid diet for 28 days. Decreases in ATP were not blocked by pyrazole pretreatment (65 mg/kg i.p.) of rats given a single dose of ethanol or by inclusion of pyrazole (200 mg/liter) in the high-ethanol diet. Ethanol-induced decreases in intestinal ATP may account, at least in part, for the inhibitory effects of ethanol on mucosal transport in the intestine.

4170 EFFECTS OF STEROIDS, FOLATE DEPRIVATION AND PROTEIN DEPRIVATION UPON TETRAHYDROFOLATE DEHYDROGENASE LEVELS IN MAMMALIAN TISSUES. *(E.)* Makulu, D. R.; Smith, E. F.; Bertino, J. R. (Yale Univ. Sch. Med., New Haven, Conn.). *Biochim. Biophys. Acta* 304(2):526-532, 1973.

4171 EFFECT OF DEHYDRATION, FOOD DEPRIVATION, SALINE AND ADRENALECTOMY ON MICROSOMAL $(Na^+ + K^+)$-DEPENDENT ATPase IN THE SALIVARY GLANDS AND INTESTINAL MUCOSA. *(E.)* Gutman, Y.; Glushevitzky-Strachman, D. (Hebrew Univ.-Hadassah Med. Sch., Jerusalem, Israel). *Biochim. Biophys. Acta* 304(2):533-540, 1973.

4172 APPEARANCE OF ^3H_2O IN RAT TISSUES RESULTING FROM THE METABOLISM OF L- ^3H FUCOSE BY INTESTINAL BACTERIA. *(E.)* Glasgow, M. S.; Quarles, R. H. (Natl. Inst. Neurol. Dis. Stroke, Bethesda, Md.). *Biochim. Biophys. Acta* 304(2):586-589, 1973.

4173 ACETYLCHOLINE RELEASE FROM GUINEA-PIG ILEUM BY PARASYMPATHETIC GANGLION STIMULANTS AND GASTRIN-LIKE POLYPEPTIDES. *(E.)* Vizi, E. S. (Inst. Pharmacol., Univ. Parma, Italy). *Br. J. Pharmacol.* 47(4):765-777, 1973.

4174 COMPARATIVE STUDY OF THE DEVELOPMENT OF ALKALINE PHOSPHODIESTERASE I AND ALKALINE PHOSPHATASE IN MUCOSA OF RAT JEJUNUM AND ILEUM. *(E.)* Hynie, I.; Zbarsky, S. H. (Dept. Biochem., Univ. British Columbia, Vancouver, Canada). *Can. J. Biochem.* 51(5): 613-620, 1973.

4175 THE ROLE OF ENERGY METABOLISM IN THE INTERACTION BETWEEN AMINO ACID AND SUGAR TRANSPORT IN THE SMALL INTESTINE. *(E.)* Bihler, I.; Sawh, P. C. (Fac. Med., Univ. Manitoba, Winnipeg, Canada). *Can. J. Physiol. Pharmacol.* 51(5):374-382, 1973.

4176 PERINATAL CHANGES OF THE ACTIVITY OF ACYL-CoA:MONOGLYCERIDE ACYLTRANSFERASE IN THE RAT INTESTINAL MUCOSA. *(E.)* Eisen, A.; Holtzapple, P.; Koldovsky, O. (Children's Hosp., Philadelphia, Pa.). *Experientia* 29(4):405-407, 1973.

4177 STIMULATION OF GLUCOSE-6-PHOSPHATASE ACTIVITY IN THE MUCOSAL CELLS OF THE MOUSE INTESTINE. *(E.)* Hugon, J. S.; Maestracci, D.; Menard, D. (Med. Ctr., Univ. Sherbrooke, Canada). *J. Histochem. Cytochem.* 21(5):426-440, 1973.

4178 BIOCHEMICAL EFFECTS OF CHOLERA ENTEROTOXIN. III. INTESTINAL PROTEIN SYNTHESIS IN THE INFANT RABBIT. *(E.)* Keusch, G. T.; Grady, G. F.; Deschner, E. E.; Weinstein, L. (Tufts Univ. Sch. Med., Boston, Mass.). *Lab. Invest.* 28(5):593-596, 1973.

4179 OXYGEN CONSUMPTION AND LACTIC ACID PRODUCTION IN ISOLATED, HOMOLOGOUSLY PERFUSED SMALL INTESTINE. *(E.)* Johnson, L. (Univ. Hosp., Uppsala, Sweden). *Acta Chir. Scand.* 139(2):184-191, 1973.

4180 THE EFFECT OF VAGAL STIMULATION ON THE RELEASE OF SECRETIN AND PANCREOZYMIN FROM THE SMALL BOWEL MUCOSA. *(E.)* Ben-Ari, G. Y.; Kaynan, A.; Dreiling, D. A.; Kark, A. E.; Rudick, J. (Poria Hosp., Tiberias, Israel). *Am. J. Gastroenterol.* 59(3):227-232, 1973.

4181 TRYPTOPHAN 5-HYDROXYLASE IN RAT INTESTINE. *(E.)* Noguchi, T.; Nishino, M.; Kido, R. (Wakayama Med. Coll., Japan). *Biochem. J.* 131(2):375-380, 1973.

4182 GLUCOSE METABOLISM IN THE RAT SMALL INTESTINE: THE EFFECT OF GLUCOSE ANALOGUES ON HEXOKINASE ACTIVITY. *(E.)* Jones, G. M.; Mayer, R. J. (Med. Sch., Univ. Nottingham, England). *Biochem. J.* 132(1):125-128, 1973.

4183 NEUTRAL HETERO-β-GALACTOSIDASE FROM RABBIT SMALL INTESTINE. *(E.)* Johnson, J. D. (Stanford Univ. Sch. Med., Calif.). *Biochim. Biophys. Acta* 302(2):382-392, 1973.

4184 METABOLISM OF 7,12-DIMETHYLBENZO(a)ANTHRACENE BY THE INTESTINAL FLORA OF THE MOUSE IN VITRO. *(Fr.)* Gentil, A.; Lasne, C.; Chouroulinkov, I. (no affil.). *C. R. Soc. Biol. (Paris)* 166(6/7): 829-833, 1972.

4185 DEMONSTRATION OF A ZONE ADAPTED TO ION TRANSPORT IN THE INTESTINE OF THE COMMON CARP (Cyprinus carpio L.). *(Fr.)* Noaillac-Depeyre, J.; Gas, N. (Lab. Anim. Ecophysiol., Paul Sabatier Univ., Toulouse, France). *C. R. Acad. Sci. [D] (Paris)* 276(5):773-776, 1973.

4186 EFFECT OF A CONTROLLED EVNIRONMENT UPON THE INTESTINAL MICROFLORA. *(E.)* Hughes, M. K.; Fusillo, M. H.; Smith, Jr., J. C. (VA Hosp., Washington, D.C.). *Environ. Biol. Med.* 2:23-27, 1973.

4187 STUDIES ON INCORPORATION OF GLUCOSE-U-^{14}C INTO INTESTINAL LIPIDS IN VITAMIN A DEFICIENT RATS. *(E.)* Bhat, P. V.; Rama Rao, P. B. (Central Food Technol. Res. Inst., Mysore, India). *Environ. Physiol. Biochem.* 2:147-153, 1972.

4188 GLUCOSE METABOLISM IN THE MUCOSA OF THE SMALL INTESTINE. ENZYMES OF THE GLYCOLYTIC PATHWAY. *(E.)* Shakespeare, P.; Ellis, R. B.; Mayer, R. J.; Hubscher, G. (Dept. Biochem., Univ. Nottingham, England). *Int. J. Biochem.* 3:671-676, 1972.

4189 RELATIONSHIP BETWEEN THE CELL CYCLE AND CELL LOCALIZATION IN CRYPTS OF THE GUINEA-PIG ASCENDING COLON. *(E.)* Rowinski, J.; Sawicki, W. (Inst. Biostructure, Sch. Med., Warsaw, Poland). *Am. J. Anat.* 135(4):537-548, 1972.

4190 REGULATION OF SMALL INTESTINAL PROTEIN METABOLISM. *(E.)* Alpers, D. H.; Kinzie, J. L. (Washington Univ. Sch. Med., St. Louis, Mo.). *Gastroenterology* 64(3):471-496, 1973.

4191 AMMONIA PRODUCTION BY INTESTINAL BACTERIA. *(E.)* Vince, A.; Dawson, A. M.; Park, N.; O'Grady, F. (St. Bartholomew's Hosp., London, England). *Gut* 14(3):171-177, 1973.

4192 ZINC METABOLISM IN THE RAT. II. SECRETION OF ZINC INTO INTESTINE. *(E.)* Methfessel, A. H.; Spencer, H. (VA Hosp., Hines, Ill.). *J. Appl. Physiol.* 34(1):63-67, 1973.

4193 CHROMATOGRAPHIC PATTERN OF HUMAN INTESTINAL GLUCAGON-LIKE IMMUNOREACTIVITY (GLI). *(E.)* Valverde, I.; Villanueva, M. L.; Lonzano, I.; Roman, D.; Diaz-Fierros, M.; Marco, J. (Jimenez-Diaz Fdn., Autonomous Univ. Madrid, Spain). *J. Clin. Endocrinol. Metab.* 36(1):185-187, 1973.

4194 EFFECT OF DIETARY PROTEIN ON THE INTESTINAL BIOSYNTHESIS OF RETINOL FROM ^{14}C-β-CAROTENE IN RATS. *(E.)* Kamath, S. K.; Arnrich, L. (Dept. Food Nutr., Iowa State Univ., Ames). *J. Nutr.* 103(2):202-206, 1973.

4195 CHOLERA ENTEROTOXIN: FAILURE OF ANTI-INFLAMMATORY AGENTS TO PREVENT CYCLIC AMP ACCUMULATION. *(E.)* Bourne, H. R. (Univ. California Med. Ctr., San Francisco). *Nature (Lond.)* 241(5389):399, 1973.

4196 PHENOBARBITAL INDUCIBLE DRUG MONOOXYGENASE ACTIVITY IN THE SMALL INTESTINE OF MICE. *(E.)* Lehrmann, C.; Ullrich, V.; Rummel, W. (Inst. Pharmacol. Toxicol., Univ. Saarland, Homburg, Germany). *Naunyn Schmiedebergs Arch. Pharmacol.* 276(1):89-98, 1973.

4197 EFFECT OF CHYME ON MUCOSAL ENZYME LEVELS IN SMALL INTESTINE OF THE RAT. *(E.)* Hietanen, E.; Hanninen, O. (Dept. Biochem., Univ. Turku, Finland). *Metabolism* 21(11):991-1000, 1972.

4198 ENZYMATIC ACTIVITY HYDROLYZING γ-GLUTAMYL-β-NAPHTHYLAMIDE IN HUMAN INTESTINE DURING ADULT AND FETAL LIFE. *(E.)* Auricchio, S.; Ciccimarra, F.; Vegnente, A.; Andria, G.; Vetrella, M. (2nd Dept. Pediatr., Univ. Naples, Italy). *Pediatr. Res.* 7(2):95-99, 1973.

4199 EFFECT OF X-RAYS AND CYTOTOXIC AGENTS ON THE CELL POPULATION OF THE CRYPTS IN THE SMALL INTESTINE IN MICE: CELL PROLIFERATION KINETICS AFTER SINGLE ADMINISTRATIONS AND EFFECTS OF VARIATIONS IN MULTIPLE DOSE SCHEDULES. *(E.)* Devik, F.; Hagen, S. (Rikshospitalet, Univ. Oslo, Norway). *Virchows Arch. (Zellpathol.)* 12(3):223-237, 1973.

4200 GASTROINTESTINAL GROWTH IN THE FETUS AND SUCKLING RAT PUPS: EFFECTS OF MATERNAL DIETARY PROTEIN. *(E.)* Younoszai, M. K.; Ranshaw, J. (Dept. Pediatr., Univ. Iowa, Iowa City). *J. Nutr.* 103(3):454-461, 1973.

See also, 3944, 4035, 4088, 4093, 4210, 4447.

GENERAL

4201 INTESTINAL VASCULAR RESPONSES TO 5-HYDROXYTRYPTAMINE. *(E.)* Biber, B.; Fara, J.; Lundgren, O. (Dept. Physiol., Univ. Goteborg, Sweden). *Acta Physiol. Scand.* 87(4):526-534, 1973.

The *in vivo* and *in vitro* effects of 5-hydroxytryptamine were investigated on the mesenteric vasculature of the cat. Intraarterial injections (10 μg) or infusions (10-15 μg/min) into the superior mesenteric artery of chloralose-anesthetized cats generally induced an intestinal vasodilation of 60-150% above control. Cholinergic blockage (0.1-1.0 mg/kg atropine i.v.) and blockade of adrenergic α-receptors (phenoxybenzamine 2 mg/kg i.v.) and β-receptors (propranolol 1 mg/kg i.v.) did not alter blood flow responses to 5-hydroxytryptamine. Intestinal motility likewise did not alter the response. Following nerve blockade by tetrodotoxin (6-10 μg) the vasodilator response to 5-hydroxytryptamine was changed to vasoconstriction. During 5-hydroxytryptamine infusions of 20-50 μg/min, intestinal blood flow and intestinal capillary filtration coefficient, measured plethysmographically, increased significantly above control, while infusions of 10-15 μg/min of 5-hydroxytryptamine increased the capillary filtration coefficient without increasing intestinal blood flow. In *in vitro* studies on strips or segments of mesenteric arteries and veins from the cat and rat, 5-hydroxytryptamine increased isometric tension in all vessels studied. The response was unaltered by adrenergic or cholinergic receptor blockade and was not related to passive tension applied to the vessels nor to the presence or absence of norepinephrine (1×10^{-6}-1×10^{-7} g/ml) in the bath. These experiments did not establish whether 5-hydroxytryptamine acts directly on smooth muscles in the smallest blood vessels, its action is mediated via a local nervous system, or these 2 mechanisms are combined.

4202 EFFECTS OF VASOPRESSIN AND ISOPRENALINE INFUSIONS ON THE DISTRIBUTION OF BLOOD FLOW IN THE INTESTINE: CRITERIA FOR THE VALIDITY OF MICROSPHERE STUDIES. *(E.)*

Greenway, C. V.; Murthy, V. S. (Fac. Med., Univ. Manitoba, Winnipeg, Canada). *Br. J. Pharmacol.* 46(2):177-188, 1972.

The distribution of superior mesenteric arterial flow in 35 cats was investigated with radioactive microspheres. The small intestine received 83% of the flow ((85 ml/min)/100 g intestine) and flow was uniform along its length. The intestinal wall was separated into 3 layers: muscle, submucosa, and mucosa. The muscle received (8 ml/min)/100 g intestine and the combined submucosa and mucosa (77 ml/min)/100 g intestine. The distribution of microspheres between the mucosa and submucosa depended on the size of the microspheres; the smaller the spheres, the more were found in the mucosa. It also depended on the state of the vascular bed; if microspheres were given during an i.v. infusion of (10 mU/min)/kg of vasopressin, a subsequent infusion of isoprenaline resulted in movement of some of the spheres from the submucosa into the mucosa. It was concluded that less than 1% of the blood flow passed through vessels larger than the ^{141}Ce microspheres in control experiments or after maximal vasodilatation of the mesenteric organs. Histological studies after India ink injection showed few capillary-sized vessels but many large vessels in the submucosa. Capillary-sized vessels arose close to the junction with the mucosa and passed into the mucosa. These and other data suggest that the intestine consists of 2 parallel-coupled sections, one to the muscle and the other through the submucosa to the mucosa. The vessels in the submucosa are in series with those in the mucosa and submucosal shunts do not exist. Redistributions of flow between mucosa and submucosa cannot therefore occur during stimulation of the sympathetic nerves or infusions of drugs such as epinephrine or norepinephrine. When microspheres are used in pharmacological investigations on distribution of blood flow in organs, controls to validate the method for the particular areas being studied are essential. If the vessels in the areas studied are in series rather than in parallel, the method is invalid.

4203 VOLATILE FATTY ACIDS IN THE FAECES OF PATIENTS IN 'GERM-FREE' ISOLATION. *(E.)*

Gompertz, D.; Brooks, A. P.; Gaya, H.; Spiers, A. S. D. (Roy. Postgrad. Med. Sch., London, England). *Gut* 14(3):183-186, 1973.

Fecal volatile fatty acids represent the end products of the metabolism of the anaerobic flora of the large bowel. The excretion of these volatile acids has been investigated in five leukemic patients maintained in plastic germ-free isolators. Under isolator conditions there is a pronounced fall in volatile fatty acid excretion. It is possible that the measurement of these acids may be used to monitor accidental anaerobic overgrowth and recolonization in these patients.

4204 STUDIES ON THE EFFECT OF SOME VASOACTIVE DRUGS ON CAPILLARY CIRCULATION IN THE STOMACH AND HIND LIMB OF RATS. *(E.)*

Filczewski, M.; Nowicka, A.; Kowalczyk, W. (Inst. Pharm. Ind., Warsaw, Poland). *Acta Physiol. Pol.* 23(2):299-305, 1972.

4205 AN INDICATOR-DILUTION METHOD FOR STUDYING INTESTINAL HEMODYNAMICS IN THE CAT. *(E.)*

Biber, B.; Lundgren, O.; Stage, L.; Svanvik, J. (Dept. Physiol., Univ. Goteborg, Sweden). *Acta Physiol. Scand.* 87(4):433-447, 1973.

4206 MUCOSAL BLOOD CIRCULATION AND ITS INFLUENCE ON PASSIVE ABSORPTION IN THE SMALL INTESTINE: AN EXPERIMENTAL STUDY IN THE CAT. *(E.)*

Svanvik, J. (Dept. Physiol., Univ. Goteborg, Sweden). *Acta Physiol. Scand.* suppl. 385:1-44, 1973.

4207 THE REACTION OF BILIRUBIN WITH DIAZOMETHANE. *(E.)*

Kuenzle, C. C.; Weibel, M. H.; Pelloni, R. R. (Sch. Vet. Med., Univ. Zurich, Switzerland). *Biochem. J.* 133(2):357-368, 1973.

4208 PROTEIN COMPONENTS OF TWO DIFFERENT REGIONS OF AN INTESTINAL EPITHELIAL CELL MEMBRANE: REGIONAL SINGULARITIES. *(E.)*

Fujita, M.; Kawai, K.; Asano, S.; Nakao, M. (Sch. Med., Tokyo Med. Dental Univ., Japan). *Biochim. Biophys. Acta* 307(1):141-151, 1973.

4209 EVOLUTIONARY ASPECTS OF THE GASTROINTESTINAL HORMONES. *(E.)*

Track, N. S. (Dept. Med., Univ. Gottingen, Germany). *Comp. Biochem. Physiol. (B)* 45(2):291-301, 1973.

4210 SHORT-TERM PERORAL TOXICITY OF UNDEGRADED CARRAGEENAN IN PIGS. *(E.)* Poulsen, E. (Inst. Toxicol., Natl. Food Inst., Soborg, Copenhagen, Denmark). *Food Cosmet. Toxicol.* 11(2):219-227, 1973.

4211 EFFECT OF CO-TRIMOXAZOLE ON FAECAL ENTEROBACTERIA: NO EMERGENCE OF RESISTANT STRAINS. *(E.)* Moorhouse, E. C.; Farrell, W. (Roy. Coll. Surg., Dublin, Eire). *J. Med. Microbiol.* 6(2):249-252, 1973.

4212 PENETRATION OF ASBESTOS THROUGH THE DIGESTIVE TRACT OF RATS. *(E.)* Pontefract, R. D.; Cunningham, H. M. (Food Res. Lab., Health Protection Br., Dept. Natl. Health Welfare, Ottawa, Canada). *Nature (Lond.)* 243(5406):352-353, 1973.

4213 INFLUENCE OF THE IMPLANTATION OF LACTOBACILLUS ACIDOPHILUS IN CHICKS ON THE GROWTH, FEED CONVERSION, MALABSORPTION OF FATS SYNDROME AND INTESTINAL FLORA. *(E.)* Tortuero, F. (Inst. Nutr. Anim. Productivity, Munic. Univ., Madrid, Spain). *Poultry Sci.* 52(1):197-203, 1973.

4214 GENETIC POLYMORPHISM OF PROLINE-RICH HUMAN SALIVARY PROTEINS. *(E.)* Azen, E. A.; Oppenheim, F. G. (Dept. Med., Univ. Wisconsin, Madison). *Science* 180(4090):1067-1069, 1973.

4215 INFLUENCE OF NUTRITIONAL DOSES OF VIRGINIAMYCIN AND SPIRAMYCIN ON THE QUANTITATIVE AND TOPOGRAPHICAL COMPOSITION OF THE GASTRO-INTESTINAL FLORA OF ARTIFICIALLY REARED PIGLETS. *(E.)* Decuypere, J.; Henderickx, H. K.; Vervaeke, I. (Fac. Agr. Sci., Univ. Ghent, Belgium). *Zentralbl. Bakteriol. (Orig.)* 223(3):348-355, 1973.

4216 THE EFFECT OF A LIPID-RICH DIET ON THE PROPERTIES AND COMPOSITION OF LIPOPROTEIN PARTICLES FROM THE GOLGI APPARATUS OF GUINEA-PIG LIVER. *(E.)* Chapman, M. J.; Mills, G. L.; Taylaur, C. E. (Middlesex Hosp. Med. Sch., London, England). *Biochem. J.* 131(2):177-185, 1973.

4217 PORTAL BLOOD FLOW AND HEAT PRODUCTION IN THE DIGESTIVE TRACT OF SHEEP. *(E.)* Webster, A. J. F.; White, F. (Rowett Res. Inst., Bucksburn, Aberdeen, Scotland). *Br. J. Nutr.* 29(2):279-292, 1973.

4218 GENERAL PATTERNS IN CAPILLARY-NEUROCELLULAR RELATIONS IN THE GASTROINTESTINAL TRACT OF MAMMALS. *(Uk.)* Mel'man, Iu. P.; Maslennykova, L. D.; Del'tsova, O. Y.; Petrukhyn, V. Y.; Ribachenko, P.V. (Ivano Frankovsk Med. Inst., USSR). *Dopov. Akad. Nauk Ukr. RSR (B)* (1):76-79, 1973.

4219 MEMBRANE POTENTIAL MEASUREMENT IN MOUSE SALIVARY GLAND CELLS. *(E.)* Petersen, O. H. (Dept. Pharmacol., Univ. Cambridge, England). *Experientia* 29(2):160-161, 1973.

4220 BIPHASIC SECRETORY POTENTIALS IN CAT AND RABBIT SUBMAXILLARY GLANDS. *(E.)* Nishiyama, A.; Kagayama, M. (Tohoku Univ. Sch. Med., Sendai, Japan). *Experientia* 29(2):161-163, 1973.

4221 LYMPH FLOW FROM THE COLON UNDER VARYING CONDITIONS. *(E.)* Nesis, L.; Sterns, E. E. (Dept. Surg., Queen's Univ., Kingston, Canada). *Ann. Surg.* 177(4):422-427, 1973.

4222 RETICULOENDOTHELIAL SYSTEM FUNCTION V. STUDIES ON THE CORRELATION BETWEEN PHAGOCYTIC RATE AND LIVER BLOOD FLOW. *(E.)* Normann, S. J. (Dept. Pathol., Univ. Florida, Gainesville). *J. Reticuloendothel. Soc.* 12(5):473-484, 1972.

4223 HEPATITIS B ANTIGEN ACTIVITY IN PROTEIN SUBUNITS PRODUCED BY SONICATION. *(E.)* Rao, K. R.; Vyas, G. N. (Univ. California Med. Ctr., San Francisco). *Nature (New Biol.)* 241(112):240-241, 1973.

4224 THE PLACE OF ISOLATED ORGAN PERFUSION IN GASTROINTESTINAL RESEARCH. *(E.)* Ritchie, H. D. (London Hosp., England). *Rendic. Gastroenterol.* 4(3):159-161, 1972.

See also, 4005, 4029, 4143, 4171.

DIAGNOSTIC PROCEDURES

4225 ASPIRATION CYTOLOGY IN THE DIAGNOSIS OF GRANULOMATOUS LIVER LESIONS. *(E.)*

Stormby, N.; Akerman, M. (Univ. Hosp., Lund, Sweden). *Acta Cytol.* 17(3):200-204, 1973.

Clinical findings and cytological examination of smears obtained from the liver by fine-needle (0.6 or 0.8 mm outer diameter) aspiration biopsy were used to determine the etiology of hepatic granulomas in 7 patients (4 women and 3 men, aged 21-83 yr). Diagnoses included sarcoidosis (3 patients), collagen disease (1), early stages of Hodgkin's disease (2), and a drug-induced allergic reaction (1). It is difficult to obtain representative samples with a fine needle from small, scattered, and irregularly distributed granulomatous foci in the liver. However, because of the low risk of complications, this technique is recommended even in patients with systemic disease where other tests show little or no evidence of liver involvement. Lack of complications also makes fine-needle aspiration biopsy an excellent tool for morphological follow-ups.

4226 THE LIVER SCAN IN METASTATIC DISEASE. *(E.)*

Rosenthal, S.; Kaufman, S. (Beth Israel Hosp., Boston, Mass.). *Arch. Surg.* 106(5):656-659, 1973.

A primary extrahepatic malignancy and documentation of the presence or absence of hepatic metastases were the criteria used in selecting 111 patients for study. Primary sites of extrahepatic gastrointestinal malignancies in patients with hepatic metastases included: colon and rectum (11), pancreas (8), stomach (0), esophagus (1), and gallbladder (1). Of 16 patients with abnormal liver function tests and hepatomegaly secondary to metastatic disease, 15 had abnormal liver scans. However, in this group of patients the clinical diagnosis of metastatic disease was obvious, and the scan added little. Documented metastatic disease with normal liver function test results was found in 10 patients who had normal livers on examination. The scan in this group was abnormal in only 1 case, a rate exceeded by the rate of falsely abnormal scans for the procedure. Of 62 patients with the documented absence of hepatic metastases and normal liver function test and physical examination results, the scan was either abnormal or equivocal in 7. This study suggests that the liver scan does not offer significant additional information in the detection of hepatic metastases. Its routine use in this group of patients is not warranted.

4227 SIMPLE METHOD FOR DETECTION OF INFECTION OF PERITONEUM DURING DIALYSIS. *(E.)*

Wardle, E. N. (Roy. Victoria Infirm., Newcastle upon Tyne, England). *Br. Med. J.* 2(5865):518-520, 1973.

The lysozyme (muramidase) content of peritoneal fluid was found to be an early indicator of infection during peritoneal dialysis. A 5.0-ml sample of clotted blood was taken morning and evening from 50 patients during the 3-day peritoneal dialysis; peritoneal effluent was monitored every sixth cycle. Lysozyme contents were assayed with *Micrococcus lysodeikticus* as substrate and standard dilutions of lysozyme. In patients developing infection during the dialysis, the lysozyme content of peritoneal fluid increased from the normal of 4.2 µg/ml to more than 7.5 and usually to above 10.0 µg/ml. The normal peritoneal dialysis fluid/serum lysozyme ratio was 0.47, but during infection the fluid lysozyme content was higher than that of the serum. Heparin inhibits the lysozyme assay, but the usual dose of 400 U/2 liters is not considered inhibitory. Monitoring of lysozyme levels can be used to indicate progress in the treatment of pancreatitis by peritoneal dialysis.

4228 LIVER-SPLEEN SCAN IN HODGKIN'S DISEASE. *(E.)*

Milder, M. S.; Larson, S. M.; Bagley, Jr., C. M.; DeVita, Jr., V. T.; Johnson, R. E.; Johnston, G. S. (Dept. Nuclear Med., Natl. Inst. Health, Bethesda, Md.). *Cancer* 31(4):826-834, 1973.

Liver-spleen scans, made after i.v. injection of ^{99m}Tc-sulfur colloid, were reviewed from 108 patients with biopsy-proven Hodgkin's disease, including 71 not previously treated. At the time of biopsy, 75% were in stages III or IV of the disease. The results were correlated with clinical and pathologic findings in 122 liver biopsies and 50 spleens. Splenomegaly on scan was associated with advancing stage and tumor involvement of the spleen and liver. Spleen size was related to the stage of the disease. A significant enlargement occurred between Stages II and III and again between III and IV. These differences in size were independent of the presence of tumor in the spleen. All 13 spleens measuring over 15 cm on scan and all 7 with filling defects were positive for tumor. In combination with the physical examination and lymphangiogram, the scan enabled accurate prediction of splenic tumor in 43% of the cases. No liver scan characteristics were diagnostic for tumors. Mean size of the right and left hepatic lobes was greatest in patients with tumor in the liver but this finding was attributable to the advanced stage of these cases. Filling defects were not a reliable sign of liver involvement. These defects occurred in liver scans from 1 of 6 patients with noncaseating granulomas, 1 of 5 patients with hepatic fibrosis, and 3 patients with fatty liver. Mottled uptake was found on scans from 1 patient with granulomas, 2 with fibrosis, and 2 with fatty liver. The combination of lymphangiogram, physical examination, and liver scan proved useful in selecting groups with very high and very low probability of liver involvement. However, only histological examination of adequate liver biopsies gives definitive information on the presence or absence of Hodgkin's disease in the liver.

4229 ANGIOGRAPHY AND COLLOID SCANNING OF BENIGN MASS LESIONS OF THE LIVER. *(E.)*

McLoughlin, M. J.; Gilday, D. L. (Toronto Gen. Hosp., Canada). *Clin. Radiol.* 23(3):377-391, 1972.

Findings from selective celiac and superior mesenteric angiography are described for 39 patients with benign mass lesions of the liver. Diagnosis in these cases were: hydatid cysts, (9), nonparasitic cysts, (4), abscesses (2), multiple nodular hyperplasia (9), cavernous hemangioma, (12), adenoma (2), and focal nodular hyperplasia (1). The presence of a thin rim of parenchymal opacification around a cystic lesion indicates that the lesion is under tension and probably increasing in size. This sign is not present with hydatid cysts which are ruptured, secondarily infected, or calcified. Multiple nodular hyperplasia is the commonest cause of an avascular mass in a cirrhotic liver, and diagnosis rests on the lack of correlation of angiographic and liver scan findings. Cavernous hemangiomas are characterized by persistant and irregular collections of contrast material. A pattern of arteries supplying liver cell adenomas may be characteristic of these lesions. Focal nodular hyperplasia also appears highly vascular on angiography. Angiography is the most sensitive method for detecting vascular lesions. The angiogram and the scan were about equally effective in detecting lesions of the right lobe of the liver, with the scan being more effective in the left lobe. The ability of focal nodular hyperplasia to concentrate labeled colloids may prove valuable in differentiating it from adenomas and malignant hepatomas. Multiple nodular hyperplasia in the cirrhotic liver can often be differentiated from other masses by its concentration of labeled colloids.

4230 CLINICAL EXPERIENCE WITH A SIMPLE TEST FOR THE DETECTION OF BACTERIAL DECONJUGATION OF BILE SALTS AND THE SITE AND EXTENT OF BACTERIAL OVERGROWTH IN THE SMALL INTESTINE. *(E.)* Egger, G.; Kessler, J. I. (Roy. Victoria Hosp., Montreal, Canada). *Gastroenterology* 64(4):545-551, 1973.

Intestinal aspirates were examined for presence of free bile salts by thin layer chromatography. Aliquots of the aspirates were passed through Millipore filters. The filters which retained the bacteria in the aspirate, were incubated for 2 hr with conjugated bile salts under aerobic and anaerobic conditions, and the bile salt composition of the incubation medium was determined. The bacterial counts of the aspirates were determined by counting the bacteria on the Millipore filters. The test was positive in all of 38 patients with documented stagnant loop syndrome. This was associated with a bacterial count in excess of 10^6/ml of aspirate and steatorrhea. In 31 patients the test became negative 7-10 days after antibiotic therapy was begun. In 5 more cases a change in antibiotics yielded satisfactory results. Two patients did not respond. Negative results coincided with decreases in bacterial counts and the disappearance or improvement of steatorrhea. The test was positive in 1 of 45 individuals without diarrhea, and in 4 of 33 patients with diarrhea but no steatorrhea. All false-positive tests occurred in patients with either a Billroth II gastroenterostomy or a pyloroplasty and vagotomy. The incidence of positive results was significantly affected by the site of sampling of intestinal contents. This was particularly true in patients with the stagnant loop syndrome and Billroth II anastomosis where false-positive test results were obtained.

4231 ENDOSCOPIC TRANS-PAPILLARY RADIOGRAPHS OF PANCREATIC AND BILE DUCTS. *(E.)* Cotton, P. B.; Salmon, P. R.; Beales, J. S. M.; Burwood, R. J. (St. Thomas' Hosp., London, England). *Gastrointest. Endosc.* 19(2):60-62, 1972.

Endoscopic retrograde cholangiopancreatography was attempted in 121 patients, 17-82 yr old. Indications were persistent jaundice of obstructive type (53 patients), suspected biliary tract disease (27), and suspected pancreatic disease (41). Cannulation, i.e. opacification of the biliary or pancreatic ducts, was achieved in 96 of 121 patients (79%); the clinically relevant duct system or systems was opacified in 85 (70%). Endoscopy alone revealed diagnostic information in 26%. Complications occurred in 4 patients and included coliform septicemia (2) and pneumonia probably caused by aspiration (1). Laparotomy, performed 4 days after retrograde cholangiography, showed small quantities of free bile in a 4th patient, but no obvious site of biliary perforation was found. None of the patients developed acute pancreatitis. Serum amylase values became elevated in 36% of the patients on whom pancreatograms were obtained, but values normalized in 2-5 days.

4232 THE DETECTION OF UPPER GASTROINTESTINAL BLEEDING SITES BY ULTRAVIOLET ENDOSCOPY. *(E.)* Smith, B. H.; Berk, J. E. (Dept. Med., Univ. California, Irvine). *Gastrointest. Endos.* 19(3): 123-124, 1973.

An assessment was made of the value of ultraviolet endoscopy in identifying bleeding sites in 26 patients with upper gastrointestinal hemorrhage. After shock was treated and bleeding arrested, each patient was first examined by conventional endoscopy. After this, each patient received 10 ml of 5% aqueous fluorescein i.v. Fluorescence of bleeding sites under ultraviolet light (3600A) was visible within 30 to 60 sec following injection. Whereas conventional endoscopy disclosed free bleeding in 12 of 26 patients examined, fluorescence due to leakage of blood containing fluorescein was observed in 23 of 26 cases. In addition, ultraviolet endoscopy indicated no bleeding in a patient previously diagnosed by conventional endoscopy as an active bleeder. Ultraviolet endoscopy also demonstrated reflux from duodenum to stomach in one case and from an efferent loop of a gastrojejunostomy in another. In interpreting active bleeding in the duodenum, it is suggested that observations be made within 4 min after fluorescein injection, because fluorescein is normally excreted in the bile and this could give false-positive results.

4233 FIBREOPTIC EXAMINATION OF THE COLON: A REVIEW OF 255 CASES. *(E.)* Teague, R. H.; Salmon, P. R.; Read, A. E. (Dept. Med., Univ. Bristol, England). *Gut* 14(2):139-142, 1973.

The results of fiberendoscopy of the colon are described in 255 consecutive examinations. Diagnosis was made by endoscopy alone in 26.5% of all examinations. This included 17 patients with carcinoma, 15 with polyps, and 25 with inflammatory bowel disease. The most common reason for referral was undiagnosed rectal bleeding (75 cases) and endoscopy alone was successful in diagnosing the probable or definitive source of bleeding in 38 (50%) of the cases referred. It is not yet clear, however, to what extent this figure may reflect the inadequacy of conventional radiology. Other indications for fiberoptic colonoscopy included non-specific diarrhea (52 cases), assessment of inflammatory bowel disease (55), equivocal radiology alone (17), and anemia, weight loss, and abdominal pain (56 cases). Endoscopic findings were as follows: proctocolitis (55 cases), Crohn's disease (16), polyps (17), carcinoma (22), normal bowel (99), diverticular disease (15), operative findings (12), and others including melanosis coli, amebiasis, and strictures (19). A definitive radiological diagnosis was refuted in 11 patients and an unnecessary laparotomy avoided in 7 of these.

4234 AN EVALUATION OF ^{75}Se SELENOMETHIONINE SCANNING AS A TEST OF PANCREATIC FUNCTION COMPARED WITH THE SECRETIN-PANCREOZYMIN TEST. *(E.)*

Braganza, J.; Critchley, M.; Howat, H. T.; Testa, H. J.; Torrance, H. B. (Manchester Roy. Infirm., England). *Gut* 14(5):383-389, 1973.

The uptake of ^{75}Se-selenomethionine by the pancreas has been evaluated in 46 patients with pancreatic disease and 56 controls; results were compared with the secretin-pancreozymin test of pancreatic function. Patients with pancreatic disease had chronic pancreatitis (18), cancer of the pancreas (14), pancreatic agenesis (1), pancreatic atrophy (1), and postacute pancreatitis (12). Abnormal scans in chronic pancreatitis and cancer of the pancreas closely paralleled the diminished exocrine secretion, especially bicarbonate output, following a submaximal dose of secretin. Of the group with no pancreatic abnormality 30% had abnormal scans, though the secretin-pancreozymin test was normal in all but 2 cases. Pancreatic scanning is of little value during and immediately after an attack of acute pancreatitis, for it tends to reflect the return of pancreatic function to normal following an acute episode. The overall incidence of normal scans in the 34 patients with chronic pancreatic insufficiency was 9%. The incidence of abnormal scans in chronic pancreatitis and cancer of the pancreas was 95% and 79%, resp. The scan failed to differentiate between the two conditions. Thus, a normal scan excludes the presence of chronic pancreatitis and cancer of the pancreas. However, an abnormal scan is found so frequently in normal subjects that it does not provide a reliable index of impaired pancreatic function.

4235 HEPATIC ARTERIOGRAPHY IN CIRRHOSIS OF THE LIVER AND PORTAL HYPERTENSION. CORRELATION BETWEEN ANGIOGRAPHIC AND FUNCTIONAL DATA. *(E.)*

Fuchs, W. A.; Preisig, R.; Voegeli, E.; Bircher, J. (Dept. Radiol., Univ. Bern, Switzerland). *Invest. Radiol.* 7(5):369-377, 1972.

In an attempt to develop criteria for the selection of patients for shunt surgery, a prospective investigation was made of liver function, hemodynamics, and angiography in 44 patients (8 women and 36 men, aged 23-70 yr) with cirrhosis and portal hypertension. Correlation of liver function, as measured by the galactose elimination capacity, with the extent of arterial perfusion of the liver, evaluated by angiographic findings, suggests that normal liver function may be maintained by the combination of significant grade 2+ arterial collateral flow and a normal-sized or enlarged hepatic artery from the superior mesenteric artery to the liver. Grade 2+ collateral flow is characterized by good filling of peripheral intrahepatic arteries through collateral channels and dilatation of arterial pancreatic arcades; nonfilling of the gastroduodenal artery from the celiac artery; and a flow defect in the proper hepatic artery. Grade 2+ arterial collaterals were found in 2 of 22 patients with moderately or significantly decreased hepatic blood flow, as determined by the indocyanine green dilution and extraction technique. These 2 patients are considered good risks for surgery since portal inflow appeared severely impaired and, consequently, a portosystemic shunt would have little effect on the liver's oxygen supply. The absence of correlation between liver function and splanchnic oxygen consumption in cirrhotics with hepatomegaly, diagnosed by scintillation scanning with ^{198}Au, suggests that the livers of these patients may be particularly vulnerable to shunt-induced ischemia. No correlation was found between increases in arterial vascular supply and increases in serum bilirubin levels.

4236 USEFULNESS OF COMPUTER SCINTIGRAPHY FOR DETECTING LIVER TUMOR WITH ^{67}Ga-CITRATE AND THE SCINTILLATION CAMERA. *(E.)*

Hamamoto, K.; Torizuka, K.; Mukai, T.; Kosaka, T.; Suzuki, T.; Honjyo, I. (Kyoto Univ. Sch. Med., Japan). *J. Nucl. Med.* 13(9):667-672, 1972.

Patients with liver tumors were examined by the scintillation camera coupled to a 1,600-channel analyzer and tape data storage for computer processing using ^{67}Ga-citrate, ^{198}Au-colloid, and ^{131}I-BSP. The 29 patients examined included 13 with primary liver cancer (11 hepatomas and 2 cholangiomas) and 16 with metastatic liver cancer. ^{67}Ga, administered as the citrate, was excreted into the bowel and distributed within the normal liver tissue, making it difficult to delineate the tumor image in the liver. The dual isotopes, ^{67}Ga-citrate and ^{198}Au-colloid (or ^{131}I-BSP), allowed computer-subtraction scintigraphy to be applied. The tumor image was delineated in 2 cases with metastatic liver tumor invisible on conventional scintiphotography with these isotopes. Positive findings on examination with ^{67}Ga-citrate, ^{198}Au-colloid, selective angiography, and subtraction scintigraphy were obtained in 12, 12, 13, and 13 patients resp., with primary liver cancer and in 17, 10, 12, and 15 patients, resp. with metastatic liver cancer. These results suggested that subtraction scintigraphy with ^{67}Ga-citrate and ^{198}Au-colloid is a superior method of detecting tumors in the liver.

4237 DIAGNOSTIC COLONOSCOPY AND COLONOSCOPIC POLYPECTOMY. *(E.)* Berci, G.; Panish, J.; Morgenstern, L. (Cedars of Lebanon Hosp., Los Angeles, Cal.). *Arch. Surg.* 106(6):818-819, 1973.

4238 TECHNIQUE OF OPERATIVE CHOLANGIOGRAPHY. *(E.)* Wilson, R. G. (Frenchay Hosp., Bristol, England). *Br. J. Clin. Pract.* 27(4): 121-123, 1973.

4239 EARLY ENDOSCOPY OF OESOPHAGUS, STOMACH, AND DUODENAL BULB IN PATIENTS WITH HAEMATEMESIS AND MELAENA. *(E.)* Cotton, P. B.; Rosenberg, M. T.; Waldram, R. P. L.; Axon, A. T. R. (St. Thomas's Hosp., London, England). *Br. Med. J.* 2(5865):505-509, 1973.

4240 A STUDY OF THE DIAGNOSTIC POSSIBILITIES OF FIBROGASTROSCOPY. *(E.)* Ferrarese, S.; De Palma, M.; Balestrazzi, A.; Neri, V.; Clemente, O. (Inst. Clin. Surg., Univ. Bari, Italy). *Chir. Gastroenterol.* 6(3):215-223, 1972.

4241 SCREENING FOR PRIMARY LIVER CANCER: THE RELATIONSHIP BETWEEN THE TIME OF APPEARANCE OF α-FOETOPROTEIN IN THE SERUM AND CLINICAL SYMPTOMS IN NINE CASES. *(E.)* Leblanc, L.; Tuyns, A. J.; Masseyeff, R. (Int. Agency Res. Cancer, Lyon, France). *Digestion* 8(1):8-14, 1973.

4242 NON-SPECIFIC IMMUNOLOGICAL PRECIPITIN REACTIONS IN α-FETOPROTEIN DETERMINATION. ANALYSIS OF TWO CASES. *(E.)* Sizaret, P.; Martin, F.; Bourgeaux, C. (IARC, Lyon, France). *Digestion* 8(1):15-21, 1973.

4243 CRITICAL EXAMINATION OF THE LIVER FUNCTION TESTS WITH ^{131}I-BROMOSULFAN AND BROMOTHALEIN. *(Ger.)* Hengst, W.; Mosler, D. (Stiftung Hosp. Heiligen Geist, Frankfurt/Main-Praunheim, Germany). *Fortschr. Geb. Roentgenstr. Nuklearmed.* 118(3):330-335, 1973.

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4247 THE CURRENT LIMITS OF CHOLANGIOGRAPHY. *(Ger.)* Voegeli, E. (Inselspital, Bern, Switzerland). *Schweiz. Med. Wochenschr.* 103(5): 153-158, 1973.

4248 INDICATIONS FOR AND LIMITATIONS OF LIVER BIOPSY AND LAPAROSCOPY. *(Ger.)* Baerlocher, C. (Munic. Hosp., Basel, Switzerland). *Schweiz. Med. Wochenschr.* 103(5):164-166, 1973.

4249 INDICATIONS FOR AND LIMITATIONS OF SCINTIGRAPHIC LIVER DIAGNOSIS. *(Ger.)* Locher, J. T. (Radiol. Inst., Univ. Basel, Switzerland). *Schweiz. Med. Wochenschr.* 103(5): 166-168, 1973.

4250 THE GALLBLADDER FOSSA IN LIVER PHOTOSCANS. *(E.)* Covington, E. E. (Mem. Hosp., New York, N.Y.). *Am. J. Gastroenterol.* 59(3):262-266, 1973.

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4253 RADIOLOGICAL DIAGNOSIS OF PANCREATITIS. *(E.)* Kohler, R. (Meilahti Hosp., Helsinki, Finland). *Ann. Chir. Gynaecol. Fenn.* 61(5):269-272, 1972.

4254 FINE-NEEDLE ASPIRATION BIOPSY OF PANCREAS. *(E.)* Koivuniemi, A.; Lempinen, M.; Pantzar, P. (2nd Dept. Pathol., Univ. Helsinki, Finland). *Ann. Chir. Gynaecol. Fenn.* 61(5):273-280, 1972.

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(E.) Georgakakis, A. (St. George's Hosp., London, England). *Br. J. Surg.* 60(2):115-116, 1973.

4256 FIBREOPTIC ENDOSCOPY AND THE BARIUM MEAL: RESULTS AND IMPLICATIONS. *(E.)* Cotton, P. B. (St. Thomas's Hosp., London, England). *Br. Med. J.* 2(5859):161-165, 1973.

4257 DIAGNOSIS OF LIVER INVOLVEMENT BY LYMPHOMA: RESULTS IN 96 CONSECUTIVE PERITONEOSCOPIES. *(E.)* Bagley, C. M.; Thomas, L. B.; Johnson, R. E.; Chretien, P. B.; DeVita, Jr., V. T. (Natl. Cancer Inst., Bethesda, Md.). *Cancer* 31(4):840-847, 1973.

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4259 ENDOSCOPY OF THE PANCREATIC DUCT. *(E.)* Classen, M.; Schwemmle, K.; Demling, L. (Dept. Med., Univ. Erlangen-Nuremberg, Erlangen, Germany). *Endoscopy* 4:221-223, 1972.

4260 A PLASTIC TUBE FOR THE MAINTENANCE OF THE STRAIGHTENING OF THE SIGMOID COLON DURING COLOSCOPY. *(E.)* Deyhle, P. (Dept. Intern. Med., Univ. Zurich, Switzerland). *Endoscopy* 4:224-226, 1972.

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4263 A STUDY OF SPLENOPORTOVENOGRAPHY IN INFANTILE CIRRHOSIS OF LIVER. *(E.)* Bajpai, O. P.; Dwivedi, M. S.; Singh, S. D.; Chhaparwal, B. C.; Pohowalla, J. N. (M.G.M. Med. Coll., Indore, India). *Indian Pediatr.* 9(12):771-781, 1972.

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4267 FLUORESCENT ANTIBODY TEST IN AMEBIASIS: CLINICAL APPLICATIONS. Ambroise-Thomas, P.; Truong, T. K. (Sch. Med., Grenoble, France). *Am. J. Trop. Med. Hyg.* 21(6):907-912, 1972.

4268 GASTRODUODENAL ENDOSCOPY: MANAGEMENT OF ACUTE UPPER GASTROINTESTINAL HEMORRHAGE. *(E.)* Allen, H. M.; Block, M. A.; Schuman, B. M. (Henry Ford Hosp., Detroit, Mich.). *Arch. Surg.* 106(4):450-455, 1973.

4269 SERUM GAMMA GLUTAMYL TRANSPEPTIDASE IN LIVER DISORDERS. *(E.)* Keane, P. M.; Garcia, L.; Gupta, R. N.; Walker, W. H. C. (St. Joseph's Hosp., Hamilton, Canada). *Clin. Biochem.* 6(1):41-45, 1973.

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4272 ENDOSCOPIC DIAGNOSIS OF EOSINOPHILIC GASTRITIS. *(E.)* Navab, F.; Kleinman, M. S.; Algazy, K.; Schenk, E.; Turner, M. D. (Univ. Rochester Sch. Med. Dentistry, N.Y.). *Gastrointest. Endosc.* 19(2):67-69, 1972.

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Coll., N.Y.). *Gastrointest. Endosc.* 19(2):72-73, 1972.

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4276 SELECTIVE USE OF BRUSHING CYTOLOGY IN GASTROINTESTINAL STRICTURES. *(E.)* Kobayashi, S.; Yoshii, Y.; Kasugai, T. (Aichi Cancer Ctr. Hosp., Nagoya, Japan). *Gastrointest. Endosc.* 19(2):77-78, 1972.

4277 THE GASTROSCOPIC YIELD FROM THE NEGATIVE UPPER GASTROINTESTINAL SERIES. *(E.)* Schuman, B. M. (Henry Ford Hosp., Detroit, Mich.). *Gastrointest. Endosc.* 19(2):79-80, 1972.

4278 RADIOLOGY OF THE SMALL INTESTINE. *(Sp.)* Carmona Munoz, J. (no affil.). *Hispalis Med.* 29(336):418-423, 1972.

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4280 A RAPID TOTAL BILIRUBIN TEST USING SODIUM HYPOCHLORITE. *(E.)* Lipsitz, P. J.; London, M. (Mt. Sinai Sch. Med., City Univ. New York, N.Y.). *J. Lab. Clin. Med.* 81(4):625-631, 1973.

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4283 INCREASED FOCAL UPTAKE OF RADIOCOLLOID BY THE LIVER. *(E.)* Mikolajkow, A.; Jasinski, W. K. (Inst. Oncol., Warsaw, Poland). *J. Nucl. Med.* 14(3):175, 1973.

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4286 EMERGENCY EVALUATION OF LIVER TRAUMA USING THE GAMMA CAMERA. *(E.)* Vadas, M.; McLaughlan, A. F.; Morris, J. G. (Roy. Prince Alfred Hosp., Sydney, Australia). *Med. J. Aust.* 1(2): 56-58, 1973.

4287 SODIUM TYROPANOATE: EVALUATION OF NEW ORAL CHOLECYSTOGRAPHIC AGENT. *(E.)* Moskowitz, H.; Milikow, E.; Osmun, G. P. (Mt. Sinai Hosp., New York). *N.Y. State J. Med.* 73(2): 271-274, 1973.

4288 CHOLEDOCHAL CYST, USE OF ROSE BENGAL SCAN IN DIAGNOSIS. *(E.)* DiMase, J. D.; Lee, H. K.; Frater, S. I. (Rhode Island Hosp., Providence). *R. I. Med. J.* 56(1):21-24, 1973.

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4290 T-TUBE CHOLANGIOGRAPHY: TECHNICAL CONSIDERATIONS FOR THE SURGEON. *(E.)* Scholz, F. J.; Wise, R. E. (Lahey Clin. Fdn., Boston, Mass.). *Surg. Clin. North Am.* 53(2):435-443, 1973.

4291 THE RADIOLOGY OF COLITIS. *(E.)* Fry, I. K. (no affil.). *Trans. Med. Soc. Lond.* 87:63-67, 1971.

4292 ARTERIOGRAPHY IN THE DIAGNOSIS OF LIVER DISEASE. *(E.)* Kreel, L. (no affil.). *Trans. Med. Soc. Lond.* 87:68-72, 1971.

4293 ANGIOGRAPHY OF THE PANCREAS AND THE LIVER: A CLINICAL EVALUATION OF THE METHOD. *(E.)* Ejerblad, S.; Erikson, U.; Johansson, H.; Karlstrom, P.; Krause, U. (Univ. Hosp., Uppsala, Sweden). *Upsala J. Med. Sci.* 77(3):175-182, 1972.

See also, 4079, 4126, 4300, 4308, 4340, 4345, 4363, 4546, 4547, 4553, 4557, 4670, 4673, 4682.

GASTROINTESTINAL DISEASES

ESOPHAGUS

4294 ESOPHAGEAL DYSFUNCTION IN COLLAGEN DISEASE. *(E.)* Turner, R.; Lipshutz, W.; Miller, W.; Rittenberg, G.; Schumacher, H. R.; Cohen, S. (Hosp. Univ. Pennsylvania, Philadelphia). *Am. J. Med. Sci.* 265(3):191-199, 1973.

In order to compare the diagnostic accuracy, prospective cineradiographic and intraluminal manometric studies of pharyngeal and esophageal dysfunction were performed in 54 patients with rigidly defined scleroderma (22 cases), polymyositis (10), systemic lupus erythematosus, (9), and rheumatoid arthritis (13). Decreased or absent distal esophageal peristalsis was demonstrated by cineradiography and manometry in 55 and 73%, resp., scleroderma patients and 13 and 3%, resp., of patients with other collagen diseases. A highly significant correlation was found with clinically diagnosed scleroderma. This manometric abnormality was seen less frequently (1 of 8) in patients with Raynaud's phenomenon unrelated to scleroderma; this difference was statistically significant. When clearly defined criteria for the diagnosis of the skeletal muscle dysfunction of polymyositis were used, no false positive diagnoses were made. Only two polymyositis patients were diagnosed by manometry and one by cineradiography as having this disease. This study thus demonstrated that distal esophageal smooth muscle dysfunction was relatively specific for clinical scleroderma; significant pharyngeal and esophageal skeletal muscle dysfunction was an infrequent finding limited to polymyositis; and manometry was somewhat more accurate and specific than cineradiography in diagnosing these changes.

4295 ON THE GENESIS OF HEARTBURN. THE EFFECTS OF SPECIFIC FOODS ON THE LOWER ESOPHAGEAL SPHINCTER. *(E.)* Babka, J. C.; Castell, D. O. (U.S. Naval Hosp., Philadelphia, Pa.). *Am. J. Dig. Dis.* 18(5):391-397, 1973.

The effects of whole and nonfat milk, orange juice, a mixture of tomato paste and water, and dilutions of chocolate syrup have been studied on pressure in the lower esophageal sphincter in 6 normal subjects (5 men and 1 woman, aged 19-24 yr). Continuous pressure measurements were made with an infused open-tipped system for 15 min before and 60 min after administration of 240 ml test meals. Water was employed as the control. Slight, but significant decreases in lower esophageal sphincter pressure occurred 15 and 45 min after whole milk ingestion. In contrast, nonfat milk produced significant increases in pressure after 45-60 min. Orange juice and tomato both caused only transient decreases in pressure with gradual return to the baseline and considerable pressure variation and secondary contractions. Chocolate syrup (1.2% fat) produced immediate and sustained 45% decreases in sphincter pressure associated with symptomatic reflux in some subjects. These findings suggest that nonfat milk may be preferable to whole milk in the treatment of heartburn; persons with heartburn should avoid chocolate, particularly that with a high fat content; and spicy foods and citrus juices probably cause heartburn by acting directly on the esophagus instead of causing a sustained decrease in the lower esophageal sphincter pressure.

4296 CAUSTIC DAMAGE OF THE GASTROINTESTINAL TRACT: ROENTGEN FEATURES. *(E.)* Franken, Jr., E. A. (Indiana Univ. Med. Ctr., Indianapolis). *Am. J. Roentgenol. Radium Ther. Nucl. Med.* 118(1): 77-85, 1973.

In 14 children who ingested caustic substances, clinical and radiological features of the acute phase included pharyngeal burns associated with aspiration. X-ray examination of the neck showed soft tissue swelling about the pharynx, edema or destruction of supraglottic structures, and aspiration pneumonia. If mediastinal involvement occurred with esophageal perforation, roentgenographic signs included mediastinal widening, pneumomediastinum, and pleural effusion. Lateral deviation of the paraspinal pleural reflection, thickening of periesophageal soft tissue, and posterior indentation of the trachea indicated mediastinal abnormalities in first few days after ingestion, even with no clinical evidence of esophageal perforation or mediastinitis. Severe esophageal injury had 3 patterns: atonic esophagus, in which severe strictures develop later; rigid esophagus, in which extensive tubular strictures develop in the narrowed esophagus; and irritable esophagus, in which tertiary waves and lack of propagation of the primary peristaltic wave are seen. Chronic manifestations included strictures occurring randomly throughout the esophagus. Hiatus hernia occurred in 4 patients in this series, and 2 others had gastroesophageal reflux without definite hernia. Progressive shortening of the esophagus with concomitant development of hiatus hernia was documented in 2 of the 4 hiatus hernia patients. Gastric antrum narrowing, chronic mediastinitis, and (infrequent) carcinoma have also developed after initial injury.

4297 INHIBITION OF THE LOWER OESOPHAGEAL SPHINCTER BY FAT: A MECHANISM FOR FATTY FOOD INTOLERANCE. *(E.)* Nebel, O. T.; Castell, D. O. (Naval Hosp., Philadelphia, Pa.). *Gut* 14(4):270-274, 1973.

The effect of fat and protein meals on the lower esophageal sphincter pressure was tested in normal subjects with an infused open-tipped manometric system. After ingestion of a minced beef meal, the mean peak pressure at the lower esophageal sphincter increased 5.8 mm Hg. In contrast, ingestion of a corn oil meal caused a mean peak decrease of 7.8 mm Hg. After the combined minced beef/corn oil meal, mean peak pressure decreased 3.0 mm Hg. Pentagastrin (3 μg/kg s.c.) caused a mean peak increase of 20.6 mm Hg when given to the subjects in the fasting state and increase of only 8.4 mm Hg when given after the fat meal. Finally, after a mean peak decrease in pressure at the lower esophageal sphincter of 6.8 mm Hg 15 min after the corn oil meal, gastric alkalinization with 30 ml of antacid caused a subsequent increase in sphincter pressure of 5.2 mm Hg. Thus fat appears to attenuate the effect of endogenous gastrin and exogenous pentagastrin stimulation of the lower esophageal sphincter. Also, fat-induced incompetency of the lower esophageal sphincter can be effectively combated by administration of antacids.

4298 METOCLOPRAMIDE IN GASTROOESOPHAGEAL REFLUX. *(E.)* Stanciu, C.; Bennett, J. R. (Hull Roy. Infirm., England). *Gut* 14(4):275-279, 1973.

The effect of metoclopramide on gastroesophageal sphincter pressure was investigated in 30 patients (16 men and 14 women, aged 18-77 yr) with symptoms of gastroesophageal reflux (heartburn, acid regurgitation, and discomfort on drinking hot fluids). Radiological evidence of hiatus hernia was demonstrated in 8 and gastroesophageal reflux in 11 patients; abnormal gastroesophageal reflux was detected in all 30 patients by 15-hr intraesophageal pH readings. A bolus injection of metoclopramide (10 mg i.v.) significantly increased gastroesophageal sphincter pressure in all of 20 patients; this increased pressure was equally marked in 3 patients who had undergone vagotomy and pyloroplasty for duodenal ulcers. Infusion of metoclopramide (40 mg/100 ml saline i.v.) at increasing rates into 10 patients showed that increased pressure is dose-related until a maximum pressure, proportional to the resting sphincter tone, is reached. When injected into 6 patients after metoclopramide infusion, atropine (0.3 mg/kg i.v.) significantly decreased gastroesophageal sphincter pressure, usually to below resting values. Metoclopramide had no effect on pressure in the gastric fundus or body of the esophagus but significantly increased the mean pressure of peristaltic contractions. These findings indicate that the action of metoclopramide on the gastroesophageal sphincter does not depend on an intact vagus nerve but may suggest that metoclopramide acts via the intramural cholinergic neuromuscular apparatus. Bolus injections of metoclopramide i.v. reduced the frequency of reflux episodes and increased the rate at which the esophagus emptied itself of an acid load in 18 patients with gastrointestinal reflux.

4299 POSTOPERATIVE BILIOUS VOMITING: TREATMENT BY REPAIR OF HIATUS HERNIA. *(E.)* Turner, F. P. (VA Ctr., Togus, Maine). *Arch. Surg.* 106(5):685-688, 1973.

4300 STUDY ON X-RAY FINDINGS OF EARLY OESOPHAGEAL CANCER. *(E.)* Yamada, A.; Kobayashi, S.; Kawai, B.; Fujimoto, A.; Nakayama, K. (Tokyo Women's Med. Coll., Japan). *Australas. Radiol.* 16(3):238-246, 1972.

4301 PREOPERATIVE IRRADIATION IN TREATMENT OF CARCINOMA OF THE OESOPHAGUS. *(E.)* Yamashita, H.; Okura, J.; Yoshioka, T.; Tanaka, Y. (Med. Sch., Keio Univ., Tokyo, Japan). *Australas. Radiol.* 16(3):250-253, 1972.

4302 ESOPHAGEAL CANCER: RESULTS OF THERAPY IN AN INDIGENT POPULATION. *(E.)* Buck, B. A.; Fletcher, W. S. (Univ. Oregon Med. Sch., Portland). *J. Surg. Oncol.* 5(2):101-111, 1973.

4303 MODIFIED GASTROPLASTY: A SIMPLE OPERATION FOR REFLUX ESOPHAGITIS WITH MODERATE DEGREES OF SHORTENING. *(E.)* Langer, B. (Toronto Gen. Hosp., Canada). *Can. J. Surg.* 16(2):84-91, 1973.

4304 MEDICAL TREATMENT OF SYMPTOMATIC HIATUS HERNIA WITH LOW-DENSITY COMPOUNDS. *(E.)* Beeley, M.; Warner, J. O. (Roy. Hosp., Sheffield, England). *Curr. Med. Res. Opinion* 1(2):63-69, 1972.

4305 THERAPEUTIC POLYPECTOMY OF THE ESOPHAGUS. *(E.)* Seifert, E.; Huchzermeyer, H.; Otto, P.; Wagner, H. H. (Med. Coll., Hannover, Germany). *Endoscopy* 4(4):228-231, 1972.

4306 OESOPHAGEAL CARCINOMA. *(E.)* Procter, D. S. C. (no affil.). *S. Afr. Med. J.* 47(8):348-351, 1973.

4307 EXPERIMENTAL AND CLINICAL STUDIES OF GASTROPLASTY IN THE MANAGEMENT OF ACQUIRED SHORT ESOPHAGUS. *(E.)* Pearson, F. G.; Henderson, R. D. (Toronto Gen. Hosp., Canada). *Surg. Gynecol. Obstet.* 136(5):737-744, 1973.

4308 DIAGNOSIS OF INTRAABDOMINAL METASTASES FROM ESOPHAGEAL CANCER WITH LAPAROSCOPY. *(Rus.)* Sotnikov, V. N.; Ermolov, A. S.; Litvinov, V. I.; Emel'ianov, S. S.; Samsonov, V. S. (N. I. Pirogov 2nd Moscow Med. Inst., USSR). *Vop. Onkol.* 19(1):35-38, 1973.

4309 REFLUX ESOPHAGITIS. *(E.)* McHardy, G. (no affil.). *Ann. Otol. Rhinol. Laryngol.* 81(6):761-769, 1972.

4310 NISSEN FUNDOPLICATION AND ESOPHAGITIS SECONDARY TO GASTROESOPHAGEAL REFLUX. *(E.)* Battle, W. S.; Nyhus, L. M.; Bombeck, C. T. (Abraham Lincoln Sch. Med., Univ. Illinois, Chicago). *Arch. Surg.* 106(4):588-592, 1973.

4311 "INKWELL" AND NISSEN VALVOPLASTY FOLLOWING ESOPHAGOGASTROSTOMY IN DOGS. *(E.)* Dew, D.; Kim, Y. S. (Grace Hosp., Detroit, Mich.). *Arch. Surg.* 106(4):594-599, 1973.

4312 FUNDOPLICATION FOR HIATUS HERNIA. *(E.)* Franklin, R. H.; Iweze, F. I.; Owen-Smith, M. S. (Roy. Postgrad. Med. Sch., London, England). *Br. J. Surg.* 60(1):65-69, 1973.

4313 THE KIRSCHNER OPERATION - A FORGOTTEN PROCEDURE. *(E.)* Ong, G. B. (Dept. Surg., Univ. Hong Kong). *Br. J. Surg.* 60(3):221-227, 1973.

4314 A CASE OF CONGENITAL TRACHEAL OBSTRUCTION WITH OESOPHAGEAL ATRESIA. *(E.)* Ashley, D. J. B. (Morriston Hosp., Swansea, Wales). *J. Pathol.* 108(3):261-263, 1972.

4315 PERFORATION OF THE ESOPHAGUS: A 30 YEAR REVIEW. *(E.)* Berry, B. E.; Ochsner, J. L. (Ochsner Clin., New Orleans, La.). *J. Thorac. Cardiovasc. Surg.* 65(1):1-7, 1973.

4316 THE HYPOTENSIVE GASTROESOPHAGEAL SPHINCTER. *(E.)* Olsen, A. M.; Schlegel, J. F.; Payne, W. S. (Mayo Clin., Rochester, Minn.). *Mayo Clin. Proc.* 48(3):165-172, 1973.

4317 RESULTS FROM RADIOTHERAPY OF ESOPHAGEAL CARCINOMA. *(Ger.)* Sadr, A.; Bohndorf, W. (Otorhinolaryngol. Clin., Univ. Wurzburg, Germany). *Med. Klin.* 66(43):1456-1460, 1971.

4318 PULMONARY COMPLICATIONS OF GASTROESOPHAGEAL REFLUX. *(E.)* Moallem, S.; Gross, A.; Gluck, M.; Kaplan, S.; Sanoudos, G. M.; Ray, III, J. F.; Clauss, R. H. (Flower and Fifth Ave. Hosp., New York). *N. Y. State J. Med.* 73(2): 279-283, 1973.

4319 AN EVALUATION OF LONG-TERM SURVIVORS TREATED FOR CANCER OF THE ESOPHAGUS WITH PREOPERATIVE X-RAY THERAPY. *(E.)* Seymour, E. Q.; Pettit, H. S. (Med. Univ. Hosp., Charleston, S.C.). *Radiology* 106(2):423, 1973.

4320 ALKALINE ESOPHAGOGASTRITIS WITH ULCERATION OF THE GASTRIC REMNANT. *(E.)* Williams, J.; Looby, W. E.; Rao, L. M.; Rehman, A. (Colorado State Hosp., Pueblo). *Rocky Mt. Med. J.* 70(2): 29-33, 1973.

4321 PRE- AND POSTOPERATIVE EVALUATION OF SCOLIOTIC PATIENTS FOR HIATAL HERNIA. *(E.)* Dickson, J. H.; Harrington, P. R. (Baylor Coll. Med., Houston, Tex.). *South. Med. J.* 66(4):489-493, 1973.

4322 ESOPHAGOMYOTOMY FOR ESOPHAGEAL ACHALASIA. *(E.)* Ellis, Jr., F. H. (Lahey Clin. Fdn., Boston, Mass.). *Surg. Clin. North Am.* 53(2):319-325, 1973.

4323 DIFFUSE SPASM OF THE ESOPHAGUS. *(E.)* Jordan, Jr., P. H.; Longhi, E. H. (Baylor Coll. Med., Houston, Tex.). *Tex. Med.* 69(3):91-98, 1973.

4324 EFFECT OF HIATUS HERNIA REPAIR AND TRUNCAL VAGOTOMY ON HUMAN LOWER ESOPHAGEAL SPHINCTER PRESSURES. *(E.)* Balison, J. R.; Woodward, E. R. (Coll. Med., Univ. Florida, Gainesville). *Ann. Surg.* 177(5):554-559, 1973.

4325 GASTROESOPHAGEAL REFLUX: DIAGNOSIS AND TREATMENT. *(E.)* Battle, W. S.; Nyhus, L. M.; Bombeck, C. T. (Abraham Lincoln Sch. Med., Univ. Illinois Med. Center, Chicago). *Ann. Surg.* 177(5):560-565, 1973.

4326 PRIMARY MALIGNANT TUMORS OF THE ESOPHAGUS OTHER THAN TYPICAL EPIDERMOID CARCINOMA. *(E.)* Turnbull, A. D.; Rosen, P.; Goodner, J. T.; Beattie, E. J. (Mem. Hosp. Cancer Allied Dis., New York, N.Y.). *Ann. Thorac. Surg.* 15(5):463-473, 1973.

4327 PSEUDOCARCINOMA OF THE ESOPHAGUS (POLYPOID CARCINOMA OF ESOPHAGUS WITH PSEUDOSARCOMATOUS FEATURES). *(E.)* Enrile, F. T.; de Jesus, P. O.; Bakst, A. A.; Baluyot, R. (Jewish Hosp. Med. Ctr., Brooklyn, N.Y.). *Cancer* 31(5):1197-1202, 1973.

4328 ACTION OF ORAL METOCLOPRAMIDE ON THE GASTROESOPHAGEAL JUNCTION IN MAN. *(E.)* Dilawari, J. B.; Misiewicz, J. J. (Central Middlesex Hosp., London, England). *Gut* 14(5):380-382, 1973.

4329 HORIZONTAL ATROPHY OF THE ALVEOLAR PROCESSES AFTER EXCLUSION OF MASTICATION CAUSED BY ESOPHAGEAL BURNS. *(E.)* Misterka, S.; Misterka, W. (Med. Acad., Wroclaw, Poland). *Pol. Rev. Rad. Nucl. Med.* 36(3):287-292, 1972.

4330 RE-APPRAISAL OF THE SENGSTAKEN-BLAKEMOORE BALLOON TAMPONADE FOR BLEEDING ESOPHAGEAL VARICES: RESULTS IN 91

PATIENTS. *(E.)* Johansen, T. S.; Baden, H. (Univ. Colorado Med. Ctr., Denver). *Scand. J. Gastroenterol.* 8(2):181-183, 1973.

4331 THE "BALANCED PROCEDURE" FOR THE TREATMENT OF HIATAL HERNIA COMPLEX: A REAFFIRMATION. *(E.)* Berman, J. K. (Indiana Univ. Sch. Med., Indianapolis). *Surg. Clin. North Am.* 53(3):529-547, 1973.

See also, 4273, 4274, 4275, 4276, 4354, 4412.

STOMACH

4332 THE EFFECT OF AZATHIOPRINE ON GASTRIC MUCOSAL HISTOLOGY AND ACID SECRETION IN CHRONIC GASTRITIS. *(E.)* Jorge, A. D.; Sanchez, D. (Fac. Med. Sci., Natl. Univ. Cuye, Argentina). *Gut* 14(2):104-106, 1973.

Patients (5 men and 9 women; aged 27-71 yr) were treated with azathioprine for 2.5-6 months. The patients included 3 with advanced superficial chronic gastritis (grade II), 5 with marked chronic gastritis with partial atrophy (grade III), and 6 with chronic gastritis and total atrophy in which intestinal metaplasia was observed (grade IV). Azathioprine was administrated to all of them for 2.5-6 months. There were no side effects except in one patient whose nausea and vomiting made it necessary to remove him from the trial. Acid output in these 14 patients showed an improvement of more than 3 mEq/liter/hr in 2 of 3 patients with superficial chronic gastritis, in 2 of 5 with marked chronic gastritis, and in 2 of 6 with chronic gastritis and total atrophy. Gastric biopsies taken after azathioprine therapy showed histological evidence of improvement in 4 of 5 patients with chronic gastritis and partial atrophy and in 5 of 6 patients with chronic gastritis and total atrophy.

4333 TRUNCAL VAGOTOMY AND DRAINAGE IN THE TREATMENT OF ULCER-LIKE DYSPEPSIA WITHOUT ULCER. *(E.)* Christiansen, J.; Aagaard, P.; Koudahl, G. (Glostrup Hosp., Copenhagen, Denmark). *Acta Chir. Scand.* 139(7):173-175, 1973.

4334 LATE RADIOLOGICAL ASPECTS OF THE STOMACH AFTER PYLOROPLASTY ASSOCIATED WITH VAGOTOMY. *(Fr.)* Dujardin, L.; Van Outryve, M.; Elewaut, A.; Pennoit, H.; Vonckers, E.; Schoofs, E.; Barbier, F. (Dept. Gastroenterol., Univ. Ghent, Belgium). *Acta Gastroenterol. Belg.* 35(12):521-528, 1972.

4335 NONFUNDIC GASTRIC VARICES. *(E.)* Sos, T.; Meyers, M. A.; Baltaxe, H. A. (New York Hosp. Cornell Univ. Med. Ctr., N.Y.). *Radiology* 105(3):579-580, 1972.

4336 DISSEMINATED LYMPHOMA INVOLVING THE STOMACH: CORRELATION OF ENDOSCOPY WITH DIRECTED CYTOLOGY AND BIOPSY. *(E.)* Katz, S.; Klein, M. S.; Winawer, S. J.; Sherlock, P. (Mem. Hosp. Cancer Allied Dis., New York, N.Y.). *Am. J. Dig. Dis.* 18(5):370-374, 1973.

4337 A REAPPRAISAL OF THE NATURE AND SIGNIFICANCE OF CHRONIC ATROPHIC GASTRITIS. *(E.)* Strickland, T. G.; Mackay, I. R. (Roy. Melbourne Hosp., Victoria, Australia). *Am. J. Dig. Dis.* 18(5):426-440, 1973.

4338 REFLUX BILE GASTRITIS. *(E.)* Pyrtek, L. J.; Bartus, S. A. (Hartford Hosp., Conn.). *Am. J. Surg.* 125(4):408-412, 1973.

4339 EVALUATION OF THE EFFECTIVENESS OF CONTROLLED pH IN MANAGEMENT OF MASSIVE UPPER GASTROINTESTINAL BLEEDING. *(E.)* Curtis, L. E.; Simonian, S.; Buerk, C. A.; Hirsch, E. F.; Soroff, H. S. (Boston City Hosp., Mass.). *Am. J. Surg.* 125(4):474-476, 1973.

4340 X-RAY DIAGNOSIS OF PROTRUDING LESIONS OF THE STOMACH. *(E.)* Ohtake, H.; Tarusawa, T.; Nishiki, T.; Hoshino, T.; Mukose, Y. (Iwate Med. Univ., Morioka, Japan). *Australas. Radiol.* 16(3):272-275, 1972.

4341 CONGENITAL HYPERTROPHIC PYLORIC STENOSIS: A REVIEW WITH 20 CASE REPORTS. *(E.)* Nan, A. K. (R. G. Kar Med. Coll., Calcutta, India). *Calcutta Med. J.* 69(3):57-71, 1972.

4342 ANTIOXIDANTS IN CEREALS AND FOOD PRESERVATIVES AND DECLINING GASTRIC CANCER MORTALITY. *(E.)* Shamberger, R. J.; Tytko, S.; Willis, C. E. (Cleveland Clin., Ohio). *Cleve. Clin. Q.* 39(3):119-124, 1972.

4343 A NEW FLEXIBLE FORCEPS FOR THE REMOVAL OF POLYPS FROM THE GASTROINTESTINAL TRACT AFTER SUCCESSFUL ENDOSCOPIC POLYPECTOMY. *(E.)* Seifert, E. (Med. Coll., Hannover, Germany). *Endoscopy* 4:226-227, 1972.

4344 A COMPARATIVE STUDY OF THE MAJOR GLYCOPROTEIN ISOLATED FROM NORMAL AND NEOPLASTIC GASTRIC MUCOSA. *(E.)* Schrager, J.; Oates, M. D. G. (Roy. Albert Edward Infirm., Wigan, England). *Gut* 14(4):324-329, 1973.

4345 THE RESULTS OF SCREENING FOR GASTRIC CANCER BY A NEW METHOD. *(E.)* Figus, A. I.; Simon, L. (Jaszbereny Hosp., Hungary). *Jap. J. Clin. Oncol.* 2(1):9-26, 1972.

4346 HEALING OF ULCERS IN EARLY GASTRIC CANCERS: SUPPLEMENTARY REPORT. *(E.)* Miwa, T.; Mutoh, Y.; Hirota, T.; Sano, R.; Sakita, T. (Natl. Cancer Ctr. Hosp., Tokyo, Japan). *Jap. J. Clin. Oncol.* 2(1):27-36, 1972.

4347 VALUE OF ELECTROGASTROGRAMS IN EVALUATION OF THE GASTRIC MOTILITY IN CANCER. *(Rus.)* Androsov, N. S.; Firsova, P. P.; Tolstykh, P. I. (Inst. Med. Radiol., Obninsk, USSR). *Vop. Onkol.* 19(1):39-43, 1973.

4348 STRESS EROSIONS: A MAJOR CAUSE OF GASTROINTESTINAL HEMORRHAGE IN PATIENTS WITH MALIGNANT DISEASE. *(E.)* Klein, M. S.; Ennis, F.; Sherlock, P.; Winawer, S. J. (Mem. Hosp. Cancer Allied Dis., New York). *Am. J. Dig. Dis.* 18(3):167-173, 1973.

4349 GASTRIC CANCER: INCREASED FREQUENCY IN PATIENTS WITH ACHLORHYDRIA. *(E.)* Segal, H. L.; Samloff, I. M. (Univ. Rochester Sch. Med. Dentistry, N.Y.). *Am. J. Dig. Dis.* 18(4):295-300, 1973.

4350 TRENDS IN STOMACH CANCER INCIDENCE FOR MALE COHORTS IN FINLAND. *(E.)* Hakama, M. (Finnish Cancer Registry, Univ. Helsinki, Finland). *Ann. Clin. Res.* 4(5):300-303, 1972.

4351 NEONATAL GASTRIC PERFORATION AND NECROSIS: NINETY-FIVE PER CENT GASTRECTOMY AND COLONIC INTERPOSITION, WITH SURVIVAL. *(E.)* Graivier, L.; Rundell, K.; McWilliams, N.; Carruth, D. (Children's Med. Ctr., Dallas, Tex.). *Ann. Surg.* 177(4):428-431, 1973.

4352 GASTRIC SECRETION AND GASTRIC MUCOSAL MORPHOLOGY IN CHRONIC ALCOHOLICS. *(E.)* Dinoso, Jr., V. P.; Chey, W. Y.; Braverman, S. P.; Rosen, A. P.; Ottenberg, D.; Lorber, S. H. (Temple Univ. Health Sci. Ctr., Philadelphia, Pa.). *Arch. Intern. Med.* 130(5):715-719, 1972.

4353 JAUNDICE, LIVER ULTRASTRUCTURE, AND CONGENITAL PYLORIC STENOSIS: A STUDY IN INFANTS. *(E.)* Levine, G.; Favara, B. E.; Mierau, G.; Bailey, W. C. (Children's Hosp., Denver, Colo.). *Arch. Pathol.* 95(4):267-270, 1973.

4354 SURGICAL TREATMENT OF REFLUX GASTRITIS AND ESOPHAGITIS. *(E.)* Coppinger, W. R.; Job, H.; DeLauro, J. E.; Westerbuhr, L. M.; McGlone, F. B.; Phillips, R. G. (Denver Clin., Colo.). *Arch. Surg.* 106(4):463-468, 1973.

4355 ELECTROSURGICAL DESTRUCTION OF A GASTRIC POLYP. *(E.)* Blackwood, W. D.; Silvis, S. E. (VA Hosp., Minneapolis, Minn.). *Gastrointest. Endosc.* 19(2):81-82, 1972.

4356 A COMPARATIVE STUDY OF PALLIATIVE RESECTIONS FOR GASTRIC CARCINOMA. *(E.)* El-Domeiri, A. A.; Knapper, W. H.; Fortner, J. G. (Univ. Illinois Coll. Med., Chicago). *J. Surg. Oncol.* 4(5/6):460-465, 1972.

4357 ETHANOL ABSORPTION AFTER GASTRIC OPERATIONS, AND IN THE COELIAC SYNDROME. *(E.)* Cotton, P. B.; Walker, G. (St. Thomas' Hosp., London, England). *Postgrad. Med. J.* 49(567):27-28, 1973.

4358 ALBUMIN TURNOVER IN MENETRIER'S DISEASE. REPORT OF ONE CASE. *(E.)* Mariani, G.; Arrigoni, P.; Bianchi, R. (2nd Med. Clin., Univ. Pavia, Italy). *Rendic. Gastroenterol.* 4(3):138-144, 1972.

4359 PATHOLOGICAL CHANGES IN THE STOMACH AND DUODENUM CAUSED BY MEDICINAL DRUGS: GASTRO-INTESTINAL HAEMORRHAGE. *(E.)* Marzi, M.; Grassi, Jr., G. B.; Lo Guzzo, R. (Arcisp. San Giovanni, Rome, Italy). *Chir. Gastroenterol.* 6(4):442-445, 1972.

4360 RADIOLOGIC EVALUATION OF RESULTS OF TREATMENT OF HYPERTROPHIC PYLOROSTENOSIS. *(E.)* Kaniewska, A. (Med. Acad., Warsaw, Poland). *Pol. Rev. Rad. Nucl. Med.* 36(2):235-241, 1972.

4361 BETA-GLUCURONIDASE ACTIVITY IN GASTRIC JUICE IN VARIOUS GASTRIC DISEASES. *(E.)* Rahbek, I.; Lintrup, J.; Jensen, E.; Kromann, N. (Copenhagen City Hosp., Denmark). *Scand. J. Gastroenterol.* 8(2):139-144, 1973.

See also, 3925, 4240, 4272, 4274, 4275, 4276, 4277, 4285, 4295, 4296, 4298, 4320, 4363, 4376, 4382, 4434, 4480, 4482, 4486, 4608, 4624, 4653, 4858, 4860.

STOMACH

Peptic Ulcers

4362 SURGICAL TREATMENT OF STRESS ULCERS. *(E.)* Byrne, J. J.; Guardione, V. A. (Boston City Hosp., Mass.). *Am. J. Surg.* 125(4):464-467, 1973.

Surgery was performed on 56 patients because of massive gastrointestinal hemorrhage apparently caused by stress ulcers. Of the patients, 25 had subtotal gastrectomy as the initial procedure. The over-all mortality was 36%. Pyloroplasty and vagotomy was the initial surgical procedure in 28 patients. The associated over-all mortality was 35%. Hemigastrectomy and vagotomy was performed on 3 patients; 1 died. A closer review of these figures indicates that if pyloroplasty and vagotomy were performed first and the patient continued to bleed, surgery should be performed immediately. This gave the lowest mortality in the series (23%). Second best results were obtained when subtotal gastrectomy was the initial operation and no further surgery was performed on patients who continued to bleed (31% mortality). These data, however, have no statistical significance and only indicate a trend in a certain direction. There is no clear-cut evidence that one type of operation is preferred to the other. With associated visceral diseases the mortality increased as follows: liver, 47%; heart, 58%; and lung, 53%. There was no mortality without associated diseases, regardless of the age of the patient.

4363 ANGIOGRAPHY IN THE DIAGNOSIS AND MANAGEMENT OF BLEEDING STRESS ULCERS AND GASTRITIS. *(E.)* Athanasoulis, C. A.; Brown, B.; Shapiro, J. H. (Boston City Hosp., Mass.). *Am. J. Surg.* 125(4): 468-473, 1973.

Upper gastrointestinal hemorrhage from erosive gastritis or stress ulcers was studied in 18 patients, (17 males and 1 female, aged 7-64 yr), by selective visceral arteriography. Positive location of the bleeding site was obtained for 13 patients on arteriography. Vasopressin (0.1-0.3 U/min) was infused intra-arterially in 6 patients. Bleeding was controlled completely in 4 and partially in 1 patient. There was no control in 1 patient whose left gastric artery was not selectively infused. With the exception of this 1 patient, no complications occurred which were directly related to the catheterization procedure or to infusion of vasopressin.

4364 HEMATOLOGIC COMPLICATIONS OF PARTIAL GASTRECTOMY. *(E.)* Mahmud, K.; Ripley, D.; Swaim, W. R.; Doscherholmen, A. (VA Hosp., Minneapolis, Minn.). *Ann. Surg.* 177(4):432-435, 1973.

Hematological disorders were investigated in 107 men, aged 26-82 yr, who had undergone partial gastrectomy an average of 8.2 yr before. Preoperative diagnoses were duodenal ulcer (75) and gastric ulcer (32). Surgical procedures were Billroth II (80) and Billroth I (27). Anemia was found in 49%. It was found more frequently in Billroth II than in Billroth I patients. A previously unrecognized high (68%) incidence of vitamin B_{12} deficiency in red cells was found; the serum levels of vitamin B_{12} were reduced in only 37%. In patients with partial gastrectomies, plasma vitamin B_{12} absorption tests were misleading. They were normal in most patients with subnormal serum and red cell vitamin B_{12} levels; only 18% of the patients had reduced vitamin B_{12} absorption by this test. Iron and folate deficiencies were each present in 1/3 of the patients. Folate deficiencies were more frequent in serum (33%) than in red cells (17%). The deficiencies of iron, vitamin B_{12}, and folate were more often combined (56 patients) than single (31 patients). While iron and vitamin B_{12} deficiencies were more frequent in the Billroth II group, folate deficiency was slightly more common following the Billroth I operation. Iron and vitamin B_{12} deficiencies appeared equally important in the causation of anemia, whereas folate deficiency was less significant in this regard. Neutrophil hypersegmentation was the most helpful morphologic indication of vitamin B_{12}

and folate deficiencies. Macrocytosis was often masked by concomitant iron deficiency. Conversely, microcytosis and hypochromasia were frequently masked by co-existent vitamin B_{12} or folate deficiencies.

4365 GASTRIN STUDIES AFTER PARIETAL CELL VAGOTOMY: IS DRAINAGE NECESSARY? *(E.)* Korman, M. G.; Hansky, J.; Coupland, G. A. E.; Cumberland, V. H. (Prince Henry's Hosp., Melbourne, Australia). *Digestion* 8(1):1-7, 1973.

Serum gastrin was measured by radioimmunoassay in patients after parietal cell vagotomy for active duodenal ulcer, with and without a drainage procedure, in both the basal state and following a standard protein meal. Results were compared with those from unoperated patients who had the same standard meal combined with continuous intragastric neutralization. In the patients with parietal cell vagotomy alone, serum gastrin rose from a basal level of 47 pg/ml to a peak of 165 pg/ml 45 min after the meal. In the parietal cell vagotomy with pyloroplasty group, serum gastrin rose from 42 pg/ml to a peak of 173 pg/ml after 45 min. In the unoperated patients undergoing concomitant intragastric neutralization, serum gastrin rose significantly with bicarbonate alone from 10 pg/ml to a 'new' basal level of 47 pg/ml and stayed at this level during the remainder of the basal hr of bicarbonate neutralization. Following a protein meal, serum gastrin rose to a peak level of 166 pg/ml after 45 min. In the selective gastric vagotomy group serum gastrin rose significantly from 52 pg/ml to a peak of 136 pg/ml at 60 min after protein. The rise above basal levels in the selective vagotomy group was significantly less than in the other groups. This study indicates that after parietal cell vagotomy there is no difference in gastrin release if the antrum is drained or undrained. Therefore, with careful patient selection at the time of surgery, a drainage procedure is not necessary to prevent increased gastrin release after parietal cell vagotomy.

4366 IMPAIRED ASSIMILATION OF EGG Co^{57} VITAMIN B_{12} IN PATIENTS WITH HYPOCHLORHYDRIA AND ACHLORHYDRIA AND AFTER GASTRIC RESECTION. *(E.)* Doscherholmen, A.; Swaim, W.R. (VA Hosp., Minneapolis, Minn.). *Gastroenterology* 64(5):913-919, 1973.

Urinary excretion tests showed that 10 patients who had undergone Billroth I or Billroth II gastrectomies 2-26 yr before for peptic ulcer absorbed only 9% of the normal amount of ^{57}Co-labeled vitamin B_{12} incorporated into scrambled eggs although they absorbed normal amounts of the crystalline vitamin. This suggests that decreased secretion of intrinsic factor may be adequate for absorption of crystalline vitamin B_{12} but inadequate for assimilation of vitamin B_{12} from food sources. Similar results were obtained on 5 patients with hypochlorhydria and 2 with achlorhydria, suggesting that gastric acid and/or pepsin are important for maintaining normal serum vitamin B_{12} levels from food sources. Absorption of both crystalline and egg-incorporated vitamin B_{12} was greatly impaired in 5 patients with pernicious anemia and in 5 other gastrectomized patients. Relatively poor absorption of egg-incorporated vitamin B_{12} by controls, in contrast to previous reports of the excellent absorption of meat-incorporated vitamin B_{12}, suggests that assimilation of vitamin B_{12} from different protein sources may differ in normal controls.

4367 THE RELATION BETWEEN GASTRIC ACID SECRETION AND BODY HABITUS, BLOOD GROUPS, SMOKING, AND THE SUBSEQUENT DEVELOPMENT OF DYSPEPSIA AND DUODENAL ULCER. *(E.)* Novis, B. H.; Marks, I. N.; Bank, S.; Sloan, A.W. (Groote Schuur Hosp., Cape Town, South Africa). *Gut* 14(2):107-112, 1973.

The augmented histamine test was used to establish acid outputs for 176 students (158 men and 18 women, aged 17-34 yr) with no evidence of gastrointestinal disease. Significant correlations were found between acid outputs and body weight and fat-free mass, but not between acid outputs and ABO blood group, height, index of attenuation (measure of ectomorphy), chest breadth to height ratio (measure of mesomorphy), or serum cholesterol levels. Basal acid output was also correlated with the number of cigarettes smoked/day. Questionnaires, answered by 142 of these subjects 10 yr later, revealed that 3 men had developed radiologically diagnosed peptic ulcer; all originally had high acid outputs. No significant differences were found between the mean acid outputs of 20 subjects with symptoms suggestive of peptic ulcer; 48 with minor dyspeptic symptoms, often related to stress or dietary or alcoholic indiscretions; and 71 with no symptoms of dyspepsia.

4368 THE EFFECTS OF VAGOTOMY ON THE INTESTINAL HANDLING OF WATER AND ELECTROLYTES. *(E.)* Bunch, G. A.; Shields, R. (Roy. Infirm., Cardiff, Wales). *Gut* 14(2):116-119, 1973.

Intestinal perfusion studies were performed on 25 patients of whom 9 underwent cholecystectomy and 9, truncal vagotomy. Immediately after surgery, water and sodium absorption in the jejunum was depressed and potassium was secreted when patients were deprived of i.v. fluids. The capacity of the vagotomized jejunum to absorb water and electrolytes was unimpaired, even in 3 patients who had severe postvagotomy diarrhea, when i.v. fluids were administered. Whatever the cause of postvagotomy diarrhea, it appears that the vagally denervated small intestine is capable of absorbing water and electrolytes at a normal rate if other factors permit.

4369 OBSTRUCTIVE JAUNDICE AND PORTAL VEIN OBSTRUCTION - RARE COMPLICATIONS OF PEPTIC ULCER. *(E.)* Khilnani, M. T.; Keller, R. J. (Mt.

Sinai Hosp., New York, N.Y.). *Mt. Sinai J. Med. N.Y.* 39(6):573-585, 1972.

Obstructive jaundice occurred secondary to peptic ulceration in 3 patients (2 men and 1 woman, aged 63-69 yr), and progressive gallbladder enlargement indicated jaundice was imminent in a 65-yr-old man. In 2 patients, inflammatory masses involving the common bile duct and porta hepatis resulted from calloused duodenal ulceration and a penetrating duodenal ulcer, resp.; they could not be distinguished from malignancies, even at surgery. The first patient recovered uneventfully after removal of the mass. The mass could not be removed from the second patient who developed stenosis of the common bile duct, leading to biliary cirrhosis and obstruction of the portal vein. This was complicated by ascites, esophageal varices, and multiple gastric erosions. Liver failure and continued gastrointestinal bleeding developed despite a splenorenal shunt operation, and the patient died. Dietary, followed by surgical, therapy of duodenal ulcers relieved symptoms of jaundice and incipient jaundice, resp. in the remaining 2 patients.

4370 PRODUCTION OF PERFORATING DUODENAL ULCERS BY 3,4-TOLUENEDIAMINE IN THE RAT.

(E.) Selye, H. (Inst. Med. Exp. Surg., Montreal, Canada). *Proc. Soc. Exp. Biol. Med.* 142(4):1192-1194, 1973.

Sprague-Dawley female rats were treated with 3,4-toluenediamine (administered in 2 ml water, twice daily by stomach tube, 50 mg/100 g each dose) for 5 days. By this time 7 of the original 13 rats had died, 6 of the 7 with gross, usually perforated duodenal ulcers. Pretreatment of 157 female rats with various steroid and nonsteroid hepatic microsomal enzyme inducers had no effect on the course of 3,4-toluenediamine intoxication. Of the 157 rats, 93 died, 83 of these with gross duodenal ulcers. Additional experiments on rats of both sexes and various weights yielded similar results. Administration of 3,4-toleunediamine p.o. in 0.5 ml peanut oil, 0.2 ml dimethylsulfoxide, 0.2 ml propylene glycol, or in water were about equally ulcerogenic and only slightly less so when administered parenterally. No duodenal ulcers were produced by the same p.o. dose of isomeric 2,4-toluenediamine. Both toluenediamine isomers caused severe icterus.

4371 A RETROSPECTIVE STUDY ON THE OUTCOME OF MASSIVE BLEEDING FROM PEPTIC ULCERATION.

(E.) Johansson, C.; Barany, F. (St. Erik's Hosp., Stockholm, Sweden). *Scand. J. Gastroenterol.* 8(2):113-118, 1973.

Follow-ups (mean of 5.9 yr) were made on 151 patients hospitalized between 1951 and 1965 inclusive for massive ulcer bleeding. Massive bleeding is defined as bleeding accompanied by hematemesis or melena with cold sweat, dizziness, and a sensation of fainting. The patients included 114 males and 37 females. Gastric ulcers were diagnosed in 44 patients, duodenal ulcers in 92, and stomal ulcers in 15. Recurrent bleeding developed in 38 (40%) of 95 patients who were given conservative therapy for their first episode of massive bleeding; 10 of these patients subsequently died. Of 57 patients treated surgically, 9 (15%) had recurrences of massive bleeding; 7 of these occurred in men with duodenal ulcers. Massive bleeding recurred in 12 of 18 conservatively treated patients with stomal ulcers. The mortality from bleeding gastric ulcers was 7.3% (4.0% for conservative therapy and 19.3% for surgery). Emergency surgery, performed on 44 patients, resulted in 10 deaths; no deaths occurred among the 36 patients who underwent elective surgery. These findings suggest that elective surgery should be considered for conservatively treated patients to reduce the high rate of severe recurrent bleeding and late mortality. Elective surgery is most indicated for recurrent bleeders, young patients, gastric ulcer patients, and male duodenal ulcer patients. Recurrent bleeding was significantly less frequent among patients who were vagotomized as part of their primary surgical procedure.

4372 EFFECT OF SECRETIN ON PENTAGASTRIN-STIMULATED GASTRIC ACID AND PEPSIN SECRETION AFTER VAGOTOMY IN MAN.

(E.) Berstad, A.; Petersen, H.; Roland, M.; Liavag, I. (Ulleval Hosp., Oslo, Norway). *Scand. J. Gastroenterol.* 8(2):119-122, 1973.

Duodenal ulcer patients (3 men and 3 women aged 26-68 yr) who had undergone a proximal selective vagotomy about 1 yr before this study were subjected to two separate gastrin secretion tests. Gastric secretion was stimulated on one occasion with pentagastrin (2 μg/kg/hr) alone and on the other occasion with pentagastrin in combination with secretin (2 U/kg/hr). On the average, secretin depressed acid secretion 18% and increased pepsin secretion 41% in response to pentagastrin during the last 1 hr of the tests. With pentagastrin administered alone, reflux of duodenal contents into the stomach was negligible. When secretin was given, reflux averaged 13.9 ml (range 0-40.0 ml) during last hr of testing. This dissociated effect of secretin on gastric acid and pepsin secretion appears independent of vagal innervation in man.

4373 BILE REFLUX IN EXPERIMENTAL STRESS ULCER.

(E.) Braun, S. A.; Samson, R. H.; Norton, L.; Eiseman, B. (Univ. Colorado Med. Sch., Denver). *Surgery* 73(4):521-524, 1973.

In 6 piglets, neither anesthesia, gastrotomy, nor application of homogeneous bile on antral mucosa caused gastric ulceration. Hemorrhagic shock for 3 hr induced ulceration in 13 surviving piglets out of 20 within 72 hr. Gross examination showed all had multiple, superficial, punctate, mucosal ulcers, 1-4 mm in diameter, in the body or fundus of the stomach along the greater or lesser curvatures. Various patterns of mucosal damage were observed histologically; they closely resembled stress ulcer in man. In 6 other piglets, application of homogeneous bile on antral mucosa prior to shock resulted in both antral and corpus gastritis and ulceration which occurred 30 min to 24 hr after retransfusion. Ligation of the common bile duct prior to shock totally prevented gastric ulceration in 6 piglets, suggesting that bile reflux in association with shock is essential in the etiology of experimental swine stress ulcer.

4374 INFLUENCE OF ATMOSPHERIC CHANGES ON THE PERFORATION OF GASTRODUODENAL ULCER. *(E.)* Hancevic, J.; Plesko, N.; Kruzic, A. (Univ. Zagreb Med. Sch., Yugoslavia). *Acta Med. Iugosl.* 26(1): 43-55, 1972.

4375 STRESS ULCER: A DEFINITION, A DISCUSSION OF OTHER STRESS-ASSOCIATED UPPER GASTROINTESTINAL LESIONS, AND AN EXPERIMENTAL MODEL. *(E.)* Goodman, A. A.; Osborne, M. P. (Dept. Surg., Harvard Med. Sch., Boston, Mass.). *Am. J. Surg.* 125(4): 461-463, 1973.

4376 MANAGEMENT OF ACUTE UPPER GASTROINTESTINAL HEMORRHAGE. *(E.)* Wilkinson, R. H. (Toronto Western Hosp., Canada). *Can. J. Surg.* 16(2):92-96, 1973.

4377 ADDITION OF OXETHAZAINE TO A STANDARD ANTACID IN TREATMENT OF DUODENAL ULCER. *(E.)* Siffert, Jr., G. (Gen. Polyclin., Rio de Janeiro, Brazil). *Curr. Med. Res. Opinion* 1(3): 139-143, 1972.

4378 MEDICAL MANAGEMENT OF PEPTIC ULCER WITH REFERENCE TO ANTI-ULCER AGENTS IN OTHER GASTRO-INTESTINAL DISEASES. *(E.)* Piper, D. W.; Heap, T. R. (Roy. North Shore Hosp., Sydney, Australia). *Drugs* 3:366-403, 1972.

4379 ENDOSCOPIC RECOGNITION OF PROXIMAL ATROPHIC BORDER OF STOMACH. *(E.)* Suzuki, S.; Yamada, K.; Suzuki, H.; Endo, M.; Takemoto, T. (Tokyo Women's Med. Coll., Japan). *Endoscopy* 4:184-189, 1972.

4380 ENDOSCOPY AND RETROGRADE CHOLANGIO-PANCREATOGRAPHY AFTER BILLROTH II OPERATION. *(E.)* Safrany, L. (Semmelweis Univ. Budapest, Hungary). *Endoscopy* 4:198-202, 1972.

4381 ENDOSCOPICAL FOLLOW-UP OBSERVATION OF DUODENAL ULCER. *(E.)* Kohli, Y.; Misaki, F.; Kawai, K. (Kyoto Prefectural Univ. Med., Japan). *Endoscopy* 4:202-208, 1972.

4382 THE EFFECT OF PRESERVING ANTRAL INNERVATION AND OF A PYLOROPLASTY ON GASTRIC EMPTYING AFTER VAGOTOMY IN MAN. *(E.)* Clarke, R. J.; Alexander-Williams, J. (Gen. Hosp., Birmingham, England). *Gut* 14(4):300-307, 1973.

4383 EFFECTS OF COMMONLY USED SPICES ON HUMAN GASTRIC SECRETION. *(E.)* Pimparkar, B. D.; Donde, U. M.; Bhiwankar, N. T.; Mehta, J. M. (K.E.M. Hosp., Parel, Bombay, India). *J. Assoc. Phys. India* 20(12):901-910, 1972.

4384 MALIGNANT TRANSFORMATION OF A DUODENAL ULCER: ONE CASE. *(E.)* Merab, A.; Ferrand, J.; Farah, P.; Khoury, K.; Tabbara, W. (Hotel-Dieu de France, Beirut, Lebanon). *J. Med. Liban.* 25(4):357-369, 1972.

4385 DUODENAL ULCER IN THE JOHANNESBURG URBAN AFRICAN. *(E.)* Bremner, C. G. (Johannesburg Hosp., South Africa). *S. Afr. J. Surg.* 10(3): 139-141, 1972.

4386 GASTRIC ACID OUTPUT IN INDIANS WITH DUODENAL ULCERS. *(E.)* Moshal, M. G.; Lautre, G.; Bader, E.; Baker, L. W.; Linck, P. L. (King Edward VIII Hosp., Durban, South Africa). *S. Afr. Med. J.* 47(6):229-230, 1973.

4387 EARLY RESULTS OF THE TREATMENT OF DUODENAL ULCER BY ULTRA-SELECTIVE VAGOTOMY WITH DRAINAGE. *(E.)* Grassi, G.; Orecchia, C.; Sbuelz, B.; Brassi, Jr., G. B. (San Giovanni Hosp., Rome, Italy). *Surg. Gynecol. Obstet.* 136(5):726-728, 1973.

4388 VALUE OF AN ANTIGASTRIN AMINO ACID IN THE TREATMENT OF PEPTIC ULCER. *(Fr.)* Geoffroy, H.; Choisy, H.; Viguie, R.; Coudoux, P. (Fac. Med., Reims, France). *Therapeutique* 48(7/8):471-474, 1972.

4389 GASTRIC ULCER IN TROPICAL AFRICA: CLINICAL FEATURES AND INCIDENCE IN BURUNDI. *(E.)* Hamber, G.; von Bergen, M. (Buye Hosp., Nhozi, Burundi). *Trop. Geogr. Med.* 25(1):1-7, 1973.

4390 GASTRIC ULCERS DUE TO THE INTAKE OF POTASSIUM CHLORIDE. *(E.)* Jacobs, E.; Pringot, J. (St. Pierre Hosp., Univ. Brussels, Belgium). *Am. J. Dig. Dis.* 18(4):289-294, 1973.

4391 DISCRIMINANT ANALYSIS OF DATA IN ULCER AND NONULCER POPULATIONS. *(E.)* Cleator, I. G. M.; Stoller, J. L.; Nunn, P. N.; Holubitsky, I. B.; Johnstone, F. R. C.; Harrison, R. C. (Dept. Surg., Univ. British Columbia, Vancouver, Canada). *Am. J. Dig. Dis.* 18(4):301-310, 1973.

4392 PERFORATED ANASTOMOTIC ULCERS. *(E.)* Cleator, I. G. M.; Holubitsky, I. B.; Harrison, R. C. (Dept. Surg., Univ. British Columbia, Vancouver, Canada). *Ann. Surg.* 177(4):436-440, 1973.

4393 A 25-YEAR EXPERIENCE WITH VAGOTOMY-ANTRECTOMY. *(E.)* Herrington, Jr., J. L.; Sawyers, J. L.; Scott, Jr., H. W. (Vanderbilt Univ. Med. Ctr., Nashville, Tenn.). *Arch. Surg.* 106(4):469-474, 1973.

4394 TRUNCAL VAGOTOMY AND DRAINAGE FOR CHRONIC DUODENAL ULCER DISEASE: A CONTROLLED TRIAL. *(E.)* Kennedy, F.; MacKay, C.; Bedi, B. S.; Kay, A. W. (Western Infirm., Glasgow, Scotland). *Br. Med. J.* 2(5858):71-75, 1973.

4395 AMILORIDE IN PRIMARY HYPERALDOSTERONISM WITH CHRONIC PEPTIC ULCERATION. *(E.)* Kremer, D.; Brown, J. J.; Davies, D. L.; Fraser, R.; Lever, A. F.; Robertson, J. I. S. (Western Infirm., Glasgow, Scotland). *Br. Med. J.* 2(5860): 216-218, 1973.

4396 SURGICAL TREATMENT OF DUODENAL ULCER IN CHILDREN. *(E.)* Kling, S. (Dept. Surg., Univ. Alberta, Edmonton, Canada). *Can. J. Surg.* 16(1):52-55, 1973.

4397 GASTRIN RELEASE IN POSTOPERATIVE ULCER PATIENTS: EVIDENCE FOR RELEASE OF DUODENAL GASTRIN. *(E.)* Stern, D. H.; Walsh, J. H. (VA Wadsworth Hosp. Ctr., Los Angeles, Calif). *Gastroenterology* 64(3):363-369, 1973.

4398 OBSERVATION ON THE HEALING OF GASTRIC LESIONS PRODUCED BY GASTROSCOPIC ELECTROSURGERY. *(E.)* Silvis, S. E.; Black, W. D. (Minneapolis VA Hosp., Minn.). *Gastroenterology* 64(3):370-374, 1973.

4399 GASTRIC ULCERATION: A COMPLICATION OF DOUBLE-LUMEN NASOGASTRIC TUBES. *(E.)* Greene, Jr., J. F.; Sawicki, J. E.; Doyle, W. F. (Letterman Gen. Hosp., Presidio of San Francisco, Calif.). *J. A. M. A.* 224(3):338-339, 1973.

4400 NEW ASPECTS OF THE EVALUATION OF GASTRIC ULCER. *(Ger.)* Oshima, H. (Steglitz Clin., Free Univ., Berlin, Germany). *Med. Welt* 23(24):875-877, 1972.

4401 CHANGES IN ACID-BASE BALANCE IN THE COURSE OF GASTRIC SECRETION IN PATIENTS WITH DUODENAL ULCER. *(E.)* Szafran, Z.; Walczak, Z.; Popiela, T. (Med. Acad., Krakow, Poland). *Pol. Med. J.* 11(5):1146-1153, 1972.

4402 CLINICAL AND EXPERIMENTAL STUDIES ON THE GASTRIC SECRETION FOLLOWING SEVERAL TYPES OF VAGOTOMY. *(Jap.)* Hirano, U. (Sch. Med., Tokushima Univ., Japan). *Shikoku Acta Med.* 28(1): 139-158, 1972.

4403 DUODENAL ULCERATION IN SICKLE CELL ANAEMIA. *(E.)* Serjeant, G. R.; May, H.; Patrick, A.; Slifer, E. D. (Dept. Med., Univ. West Indies, Kingston, Jamaica). *Trans. R. Soc. Trop. Med. Hyg.* 67(1):59-63, 1973.

4404 MECHANISM OF ACTION OF PROXAZOLE CITRATE IN PEPTIC ULCER DISEASE. *(E.)* Asano, K. (Okayama City Hosp., Japan). *Chir. Gastroenterol.* 6(4):366-378, 1972.

4405 MINIMAL DOSE OF A STIMULUS FOR MAXIMAL PEPSIN SECRETION. *(E.)* Desai, H. G.; Zaveri, M. P.; Antia, F. P. (B. Y. L. Nair Charitable Hosp., Bombay, India). *Postgrad. Med. J.* 49(570):258-260, 1973.

4406 A FOLLOW-UP OF PATIENTS OPERATED UPON FOR RECURRENCE AFTER VAGOTOMY AND DRAINAGE FOR DUODENAL ULCER. *(E.)* Kronborg, O. (Bispebjerg Hosp., Copenhagen, Denmark). *Scand. J. Gastroenterol.* 8(2):123-128, 1973.

4407 EFFECT OF TRANSABDOMINAL VAGOTOMY ON THE HUMAN GASTROESOPHAGEAL HIGH-PRESSURE ZONE. *(E.)* Mazur, J. M.; Skinner, D. B.; Jones, E. L.; Zuidema, G. D. (Johns Hopkins Univ. Sch. Med., Baltimore, Md.). *Surgery* 73(6):818-822, 1973.

4408 ROLE OF CATECHOLAMINES AND SOME SUBSTANCES WITH VEGETATIVE EFFECT IN EXPERIMENTAL GASTRIC ULCERS IN RATS. *(E.)* Billewicz-Stankiewicz, J.; Gorny, D.; Flisiak, A. (Med. Acad., Lublin, Poland). *Acta Physiol. Pol.* 23(2):271-283, 1972.

4409 ABERRANT HUMAN GASTRIC RESPONSE TO SECRETIN. *(E.)* Silvis, S. E.; Doscherholmen, A. (Dept. Med., Univ. Minnesota, Minneapolis). *Am. J. Med. Sci.* 265(4):303-313, 1973.

4410 CHANGES IN THE SURGICAL TREATMENT OF PEPTIC ULCER. *(E.)* Saxbe, Jr., W. B.; Ross, F. P. (Burbank Hosp., Fitchburg, Mass.). *Arch. Surg.* 106(6):822-825, 1973.

STOMACH

4411 EFFECT OF CARBENOXOLONE SODIUM ON STRESS-INDUCED GASTRIC DAMAGE IN RATS. *(E.)* Perkins, W. E.; Vars, L. (Pfizer Inc., Groton, Conn.). *Br. J. Pharmacol.* 47(4):847-849, 1973.

4412 PATTERN OF GASTRIC EMPTYING AFTER VAGOTOMY AND PYLOROPLASTY. *(E.)* Colmer, M. R.; Owen, G. M.; Shields, R. (Cardiff Roy. Infirm., Wales). *Br. Med. J.* 2(5864): 448-450, 1973.

See also, 4246, 4271, 4346.

SMALL INTESTINE

4413 PATHOLOGIC FINDINGS FROM INTESTINAL BIOPSY SPECIMENS IN HUMAN CHOLERA. *(E.)* Asakura, H.; Morita, A.; Morishita, T.; Tsuchiya, M.; Fukumi, H.; Ohashi, M.; Uylangco, C.; Castro, A. (Sch. Med., Keio Univ., Tokyo, Japan). *Am. J. Dig. Dis.* 18(4):271-278, 1973.

A histopathological study was made of jejunal biopsies obtained from 6 patients with cholera. Cultures grown from their rectal swabs were all positive for *Vibrio cholerae*. Pathological desquamation and necrosis of the mucosal epithelium, together with degenerative changes, were found in 4 of 5 biopsies. Intestinal villi had zigzag tips, and a scalloped epithelial lining was found adjacent to abnormal villi. Epithelial desquamation in cholera was not due to postmortem autolysis nor terminal vascular collapse. Abundant mucus was found in the lumens of the crypts, and the intestinal villi were coated with mucus. An increase in the cellularity of the lamina propria was due to infiltration of mononuclear plasma cells and lymphocytes. It is emphasized that the copious diarrhea is due to multiple pathologic desquamation and necrosis of the intestinal epithelium, as well as to hypersecretion of epithelial cells and excessive production of mucus in the crypts.

4414 ARTERIOGRAPHIC DIAGNOSIS OF INTUSSUSCEPTION. THREE CASE REPORTS. *(E.)* Chang, T. T.; Huang, T. Y. (Tri-Service Gen. Hosp., Taipei, Taiwan). *Am. J. Roentgenol. Radium Ther. Nucl. Med.* 117(2):317-322, 1973.

Mesenteric arteriographic studies of 3 men, aged 37-59 yr, showed characteristic changes. Results of pathologic examinations of each patient were: lymphosarcoma of the terminal ileum with metastases to adjacent lymph nodes and ileocecal-colic intussusception; a mucinous adenocarcinoma of the ascending colon with colon-to-colon intussusception; and a reticulum cell sarcoma of the ileocecal valve with intussusception. The earliest roentgenographic change seen in the arteriogram is a group of stretched, closely packed parallel vessels displaced from their normal position, with their long axis perpendicular to the direction of adjacent normal mesenteric vessels. In more severe degrees of intussusception, the abnormal vessels become doubled back on themselves, producing a hairpin curve. The site of the intussusception can be determined by noting which branches of a particular artery are involved. The mass formed by the intussusception may itself be seen as a radiolucent area. If neoplasm is the cause of the intussusception, vessels supplying the tumor may be identified or tumor staining can occur. Selective mesenteric arteriography can be a helpful diagnostic procedure when intussusception is suspected.

4415 DUODENAL MUCOSAL DAMAGE IN 31 INFANTS WITH GASTROENTERITIS. *(E.)* Barnes, G. L.; Townley, R. R. W. (Roy. Children's Hosp., Melbourne, Australia). *Arch. Dis. Child.* 48(5):343-349, 1973.

Most duodenal biopsies taken during the acute stage of gastroenteritis in 31 infants (21 males and 10 females, all less than 12 months in age) have shown histological abnormalities and disaccharidase depression. In 5, mucosal damage was severe with changes similar to those seen in celiac disease. The degree of mucosal damage was not related to the clinical severity of the disease. Repeat biopsies in 3 of these showed marked improvement after 3 days, 8 days, and 7 weeks, resp. Persistent sugar intolerance occurred in approximately 50% of patients under 6 months of age, but this complication bore no relation to disaccharidase depression in the acute stage of the illness. Single biopsies offer reliable information about the degree of mucosal damage; multiple biopsies are required to exclude the possibility of patchy damage in the duodenum and to ascertain the length of small intestine involved. The severity of the disease may be more closely related to the length of involved segment than to the degree of discernible change in the duodenum.

4416 BACTERIAL FLORA IN THE DUODENUM OF PATIENTS AFTER BILIARY FENESTRATION. *(E.)* Thomas, E.; Grant, A. K.; Holford, M.; Ringwood, D.; Derrington, A. W.; Magarey, J. R. (Queen Elizabeth

Hosp., Woodville, South Australia). *Br. J. Surg.* 60(2):107-111, 1973.

A study was made of fasting duodenal aspirates taken from 15 patients with biliary fenestration, 5 patients with a single duodenal diverticulum, 1 patient with biliary fenestration and a duodenal diverticulum, and 11 controls. Biliary fenestration had been performed for cholecystitis (14), cholelithiasis (11), choledocholithiasis (3), and biliary cirrhosis (1). Gross evidence of pancreatitis was found in 2 of these 15 patients. A colonic type of bacterial and *Streptococcus faecalis*, was found in 10 patients with biliary fenestration, 4 with a duodenal diverticulum, the patient with fenestration and a duodenal diverticulum, and in 1 of the controls. A high incidence of bile salt deconjugation (10 cases) and of steatorrhea (8 cases) was noted in patients with biliary fenestration and in those with a duodenal diverticulum (5 and 3 patients, resp.). Serum folate levels were elevated in 3 subjects with coliform colonization. Vague abdominal symptoms experienced by patients after biliary fenestration may be due to an abnormal bacterial flora in the duodenum.

4417 PATTERNS OF BILE ACIDS AND MICROFLORA IN THE HUMAN SMALL INTESTINE. II. MICROFLORA. *(E.)* Mallory, A.; Savage, D.; Kern, Jr., F.; Smith, J. G. (Univ. Colorado Sch. Med., Denver). *Gastroenterology* 64(1):34-42, 1973.

The microbial flora of the small bowel and feces was examined in 12 normal control subjects, 8 patients with ileal resection (4 with and 4 without recurrent regional enteritis), and 3 patients with small bowel stasis. Intestinal contents were collected and cultured under rigorous anaerobic conditions to assure growth of oxygen-intolerant bacteria. The samples of intestinal fluids were collected from 5 areas, 50 cm apart. Most normal subjects had small numbers of gram-positive aerobic bacteria in their proximal and mid-small bowels. In addition, some of these controls had populations of coliforms and anaerobic bacteria (*Bacteroides*) at levels up to 10^4/ml in the same regions. The anaerobes included streptococci, lactobacilli, bifidobacteria, gram-negative cocci, and fusiforms. Four patients with ileal resection had significant overgrowth of a fecal-type flora in the small bowel regardless of whether or not small bowel disease was present. Impressive overgrowth of a fecal-type flora was present in the small intestine of all 3 patients with stasis. Anaerobic tapered rods (fusiform-shaped bacteria) were present in the feces of patients with resection less often than in normal subjects. There were no other differences in fecal flora among the three groups.

4418 HISTOPATHOLOGICAL AND ELECTRON MICROSCOPIC STUDIES OF LYMPHANGIECTASIA OF THE SMALL INTESTINE IN BEHCET'S DISEASE. *(E.)* Asakura, H.; Morita, A.; Morishita, T.; Tsuchiya, M.; Watanabe, Y.; Enomoto, Y. (Sch. Med., Keio Univ., Tokyo, Japan). *Gut* 14(3):196-203, 1973.

The gastrointestinal involvement and immunological findings in 16 patients (13 men and 3 women, aged 22-55 yr) with Behcet's disease are described. Of 15 biopsies of jejunal mucosa 4 showed marked lymphangiectasia in the lamina propria which were similar to characteristic findings in protein-losing enteropathy. Of the 16 patients, 8 had manifestations of gastrointestinal involvement. Only 1 case was associated with multiple ulcers of the ileum and colon. None of the patients had hypoproteinemia. Increases of serum immunoglobulin IgA were found in 6 of 15 cases, of IgM in 5 of 15; and of IgG in 1 of 15. A decrease in serum IgA and IgM was observed in only 1 case. Electron microscope studies showed thousands of precipitated lipoprotein-like bodies in the extracellular spaces of the lamina propria.

4419 TREATMENT OF DERMATITIS HERPETIFORMIS WITH CORTICOSTEROIDS AND A GLUTEN-FREE DIET: A STUDY OF JEJUNAL MORPHOLOGY AND FUNCTION. *(E.)* Kumar, P. J.; Silk, D. B. A.; Marks, R.; Clark, M. L.; Dawson, A. M. (St. Bartholomew's Hosp., London, England). *Gut* 14(4):280-283, 1973.

The jejunal morphological and functional response to either a gluten-free diet or corticosteroid therapy was studied in 6 men, aged 32-62 yr, with dermatitis herpetiformis. None had clinical evidence of malabsorption. The corticosteroid therapy consisted of 60 mg/day of prednisolone for 1 week, with weekly reductions of 15 mg to a dose of 15 mg. Thereafter, prednisolone was reduced by 5 mg each week over the next 3 weeks. In each treatment group there were 2 patients with subtotal villous atrophy and 1 with partial villous atrophy. In both groups, morphological improvement was seen in villous and surface cell heights, mucosal thickness, and intraepithelial lymphocyte counts after treatment. Jejunal function was assessed with the perfusion technique. Absorption of glucose from a 56 mM solution improved. Water from this solution was secreted in 2 patients in each group before treatment and moved into the normal absorptive range after treatment. These results further emphasize the similarity between the mucosal lesion of dermatitis herpetiformis and true celiac disease.

4420 CELLULAR LOCALIZATION OF GASTRIC INHIBITORY POLYPEPTIDE IN THE DUODENUM AND JEJUNUM. *(E.)* Polak, J. M.; Bloom, S. R.; Kuzio, M.; Brown, J. C.; Pearse, A. G. E. (Hammersmith Hosp., London, England). *Gut* 14(4):284-288, 1973.

Indirect immunofluorescence studies with an antiserum to purified porcine gastric inhibitory polypeptide indicate, in the gastrointestinal tract of dog and man, that this polypeptide is present in cells situated predominantly in the mid-zone of the glands in the duodenum and, to a lesser extent, in the jejunum. Human cells containing gastric inhibitory polypeptide were most easily found in duodenal samples from patients with gastric carcinoma and low gastric acidity, but were difficult to find in patients with duodenal ulcer. Absolute correlation of the gastric inhibitory polypeptide cell with one or other of the known endocrine-like cells identified by electron microscopy awaits confirmation by electron immunocytochemistry. It is here identified as an endocrine polypeptide cell of the gastric endocrine polypeptide (APUD) series and, provisionally, as the D_1 cell. While the hormonal status of a given polypeptide depends ultimately on physiological experiments the present results strengthen the view that gastric inhibitory polypeptide is indeed a hormone.

4421 THE PHYSICAL STATE OF BILE ACIDS IN THE DIARRHOEAL STOOL OF ILEAL DYSFUNCTION.

(E.) Findlay, J. M.; Eastwood, M. A.; Mitchell, W. D. (Western Gen. Hosp., Edinburgh, Scotland). *Gut* 14(4):319-323, 1973.

A centrifugation method which separates the free water of a diarrheal stool from a pellet which has a water content similar to normal stool has been used to estimate water and bile acid distribution in abnormal feces from 7 patients with varying degrees of ileal resection. Freeze-dried pellet from the patients had a significantly higher bile acid content than that from 8 controls (patient mean = 55.8 mg bile acids/g freeze-dried feces; normals = 8.3 mg bile acids/g freeze-dried feces). Bile acids were also present in appreciable amounts in the supernatant from these patients. This suggests that the ability of dietary residue to bind bile acids reaches saturation in patients with ileal resection. Therefore, a certain proportion of fecal bile acids goes into solution. Fecal electrolytes were evenly distributed between pellet water and supernatant water, suggesting that these are in equilibrium. Fecal fat values were greater than normal in 5 of the 7 patients. Studies of diurnal changes in 3 patients showed that stool weight and total bile acids decrease throughout the day, but the percentage of supernatant and the bile acid concentration in the supernatant do not change. No relation was found between fecal bile acid excretion, results of the Schilling test, or fecal fat excretion/24 hr.

4422 VALUE OF SMALL INTESTINAL BILE ACID ANALYSIS IN THE DIAGNOSIS OF THE STAGNANT LOOP SYNDROME.

(E.) Northfield, T. C.; Drasar, B. S.; Wright, J. T. (Guy's Hosp., London, England). *Gut* 14(5):341-347, 1973.

Simple methods of analyzing bile acids in human small intestinal aspirates have been studied in order to assess their suitability for routine clinical investigation of patients with steatorrhea. After extraction into methanol, samples were analyzed qualitatively for bile acid deconjugation by thin-layer chromatography and quantitatively by the 3-α-hydroxysteroid dehydrogenase enzyme assay. These methods gave good recoveries, and were sensitive, accurate, specific, and sufficiently simple and rapid for routine diagnostic purposes. This diagnostic procedure was used to identify patients with steatorrhoea due to the stagnant loop syndrome, and was compared with other tests for this condition, i.e., study of the small intestinal bacterial flora, urinary indican excretion, and the Schilling test with added intrinsic factor. Groups of subjects studied were: 9 patients with steatorrhoea due to the stagnant loop syndrome; 6 patients with an anatomical stagnant loop that was not causing steatorrhoea; and 11 subjects with no known gastrointestinal disease. The screening of postprandial upper jejunal samples for bile acid deconjugation was the most useful diagnostic test, being positive in 8 patients from the first group, but in no others. At lower levels of the small intestine, bile acid deconjugation was found in subjects from the latter 2 groups. The other three diagnostic tests discriminated poorly between patients with steatorrhoea due to stagnant loop syndrome and those with an anatomical stagnant loop but no steatorrhoea.

4423 BILE ACIDS IN THE DIARRHOEA OF ILEAL RESECTION.

(E.) Mitchell, W. D.; Findlay, J. M.; Prescott, R. J.; Eastwood, M. A.; Horn, D. B. (Western Gen. Hosp., Edinburgh, Scotland). *Gut* 14(5):348-353, 1973.

To separate stools into pellet and supernatant, 20 diarrheal stools from 3 patients with ileal resection were centrifuged at 10°C and 14,000 g for 1 hr. Bile acids and electrolytes were measured in each phase. Multiple regression analysis showed a linear relation between the amount of chenodeoxycholic acid excreted and electrolyte loss; this relation was characteristic for each individual. Whether it was present in the pellet (concentration range 9.0-21.8 mM) or supernatant (concentration range 0.2-3.5 mM), chenodeoxycholic acid was associated with water and electrolyte loss. Despite cholic acid concentrations of 14-30 mM in the pellet, this bile acid appears to have no effect on diarrhea. Although it has previously been reported that cholic acid in solution does not inhibit electrolyte and water reabsorption, cholic acid (concentration range 2.2-5.2 mM) is significantly related to water and electrolyte loss. This association between cholic acid and water loss can be explained by postulating that the more water produced by chenodeoxycholic acid inhibition of reabsorption, the more cholic acid will be dissolved in this free water. This postulate is supported by the failure to find an association between total cholic acid and electrolyte or water loss once the association between cholic and chenodeoxycholic acids and pellet weight were taken into account. It would appear that the total amount of chenodeoxycholic acid entering the colon, irrespective of its physical state, is the causative agent of the diarrhea of ileal dysfunction.

4424 REVERSAL OF AN INTESTINAL SEGMENT IN THE LONG-TERM MANAGEMENT OF THE SHORT-BOWEL SYNDROME.

(E.) Perlman, M. M.; Stein, A.; Schamroth, L. (Baragwanath Hosp., Johannesburg, South Africa). *S. Afr. Med. J.* 46(45):1730-1733, 1973.

A severe case of malabsorption is reported in a 25-yr-old Bantu man after resection of all but 50 cm of the small intestine for multiple, penetrating stab wounds of the abdomen. Striking improvement in his nutritional state and general well-being was achieved by reversal of a short segment of the residual jejunum. This procedure results in antiperistalsis which delays the passage of intestinal contents, and thus permits more time for absorption. Improved absorption became evident soon after corrective surgery, as evidenced by reduction of stool frequency, steady weight gain, and regression of skin lesions caused by vitamin A and C deficiencies. Fat absorption returned to normal and a marked improvement occurred in carbohydrate absorption.

4425 REOPERATION FOR CONGENITAL DUODENAL DIAPHRAGM. *(E.)* Swartz, R. M.; Hunter, M. T.; Hartz, C. R. (U.S. Air Force Hosp., Ellsworth, S.D.). *Ann. Surg.* 177(4):441-447, 1973.

4426 CLINICAL EXPERIENCE WITH PANCREATICO-DUODENAL TRANSPLANTATION. *(E.)* Connolly, J. E.; Martin, D. C.; Steinberg, T.; Gwinup, G.; Gazzaniga, A. B.; Bartlett, R. H. (Dept. Surg., Univ. California, Irvine). *Arch. Surg.* 106(4):489-494, 1973.

4427 CARCINOMA OF THE AMPULLA OF VATER AND DUODENUM. *(E.)* Blumgart, L. H.; Kennedy, A. (Sheffield Roy. Infirm., England). *Br. J. Surg.* 60(1):33-40, 1973.

4428 INTRALUMINAL DIVERTICULUM OF THE DUODENUM. *(E.)* Papalexandris, N. M.; Lewis, D. L. (Roy. Salop Infirm., Shrewsbury, England). *Br. J. Surg.* 60(1):78-80, 1973.

4429 LATE INJURIES OF THE SMALL INTESTINE FOLLOWING RADIOTHERAPY FOR UTERINE CARCINOMA. *(E.)* Joelsson, I.; Raf, L. (Serafimer Hosp., Stockholm, Sweden). *Acta Chir. Scand.* 139(2):194-200, 1973.

4430 PERFORATION OF A JEJUNAL DIVERTICULUM CONTAINING A LYMPHOSARCOMA AND ACCOMPANIED BY UPPER GASTROINTESTINAL HAEMORRHAGE: REPORT OF A CASE. *(E.)* Haggmark, T.; Bystrom, J. (Karolinska Hosp., Stockholm, Sweden). *Acta Chir. Scand.* 139(2):210-212, 1973.

4431 HISTOLOGICAL ALTERATIONS OF THE SMALL INTESTINE IN NORMAL INFANTS WITH ACUTE DIARRHEA. *(E.)* Toccalino, H.; Licastro, R.; Garcia Cardo, A.; Williams, M. (Alejandro Posadas Polyclin., Villa Sarmiento, Haedo Norte, Buenos Aires, Argentina). *Acta Gastroenterol. Latinoam.* 4(3):129-134, 1972.

4432 REVERSIBLE MESENTERIC VASCULAR OCCLUSION ASSOCIATED WITH ORAL CONTRACEPTIVES. *(E.)* Nothmann, B. J.; Chittinand, S.; Schuster, M. M. (Baltimore City Hosp., Md.). *Am. J. Dig. Dis.* 18(5):361-368, 1973.

4433 DIPHENOXYLATE HYDROCHLORIDE INTOXICATION SIMULATING INTESTINAL OBSTRUCTION. *(E.)* Figiel, L. S.; Figiel, S. J. (no affil.). *Am. J. Gastroenterol.* 59(3):267-270, 1973.

4434 GASTROJEJUNOCUTANEOUS FISTULA. *(E.)* Pelliccia, O.; Sreenivas, V. I.; Khu, E. G.; Farmer, D. A. (Hosp. St. Raphael, New Haven, Conn.). *Am. J. Surg.* 125(4):403-407, 1973.

4435 INTESTINAL OBSTRUCTION CAUSED BY GALLSTONES. *(E.)* Karaharju, E. O.; Rannikko, S. (Univ. Central Hosp., Helsinki, Finland). *Ann. Chir. Gynaecol. Fenn.* 61:181-184, 1972.

4436 LYMPHOVENOUS OBSTRUCTION IN ANOMALOUS MIDGUT ROTATION. *(E.)* Verma, T. R.; Bankole, M. A. (Hammersmith Hosp., London, England). *Arch. Dis. Child.* 48(2):154-157, 1973.

4437 INTRAMURAL HEMATOMA OF THE DUODENUM. *(E.)* Montasir, A.; O'Sullivan, W. D. (Phoenix Hosp., Ariz.). *Ariz. Med.* 30(1):23-27, 1973.

4438 EFFECT OF PANCREATIC ENZYMES ON PROTRUDING ILEOSTOMY STOMAS. *(E.)* Bessa, S. M.; Ghanem, M.; Berzins, U. J.; Breen, J.; Goodale, Jr., R. L.; Wangensteen, O. H. (Dept. Surg., Univ. Minnesota, Minneapolis). *Arch. Surg.* 106(5):713-716, 1973.

4439 PNEUMOMEDIASTINUM AND SUBCUTANEOUS EMPHYSEMA AFTER PERFORATION OF THE DUODENUM DURING GASTROSCOPY. *(E.)* Allan, R. N.; Smallwood, C. J. (Gen. Hosp., Birmingham, England). *Br. J. Surg.* 60(2):156-157, 1973.

4440 ADENOCARCINOMA DEVELOPING IN AN ILEOCYSTOPLASTY. *(E.)* Leedham, P. W.; England, H. R. (London Hosp., England). *Br. J. Surg.* 60(2):158-160, 1973.

4441 RETROGRADE TRANSCECAL SMALL-INTESTINAL DECOMPRESSION IN INTESTINAL OBSTRUCTION. *(E.)* Jacobson, Y. G. (no affil.). *Dis. Colon Rectum* 16(2):110-112, 1973.

4442 A CASE OF MECKEL'S DIVERTICULUM DIAGNOSED BY PERITONEOSCOPY. *(E.)* Cortesi, N.; Gibertini, Jr., G.; Ghidini, G. (Dept. Surg., Univ. Modena, Italy). *Endoscopy* 4:237-238, 1972.

4443 A CASE OF VESICO-INTESTINAL FISTULA WITH STONE BLADDER AND A STICK IN THE SMALL BOWEL. *(E.)* Kabir, M.; Afridi, S. K. (Khyber Med. Coll., Peshawar, Pakistan). *J. Pakistan Med. Assoc.* 22(6):170-173, 1972.

4444 TRAUMATIC RUPTURE OF DIVERTICULUM OF THE JEJUNUM. *(E.)* Rahman, M. (Dacca Med. Coll., Bangla Desh). *J. Pakistan Med. Assoc.* 22(6):174-178, 1972.

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4446 JEJUNOSTOMY BY A NEEDLE CATHETER TECHNIQUE. *(E.)* Delany, H. M.; Carnevale, N. J.; Garvey, J. W. (Montefiore Hosp. Med. Ctr., Morrisania Affil., Bronx, N.Y.). *Surgery* 73(5):786-790, 1973.

4447 THE EFFECT OF INTRALUMINALLY ADMINISTERED GLUCOSE IN REDUCING FLUID AND ELECTROLYTE LOSS FROM THE ISCHEMIC INTESTINE. *(E.)* Hueckel, H. J.; Chiu, C. J.; Hinchey, E. J. (McGill Univ. Surg. Clin., Montreal Gen. Hosp., Canada). *Surg. Gynecol. Obstet.* 136(5):780-784, 1973.

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4450 HEALING OF PARTIALLY ISOLATED SMALL-INTESTINAL ANASTOMOSES IN RABBITS AND DOGS. *(E.)* Cohen, M. M.; Harrison, R. C. (Dept. Surg., Univ. British Columbia, Vancouver, Canada). *Can. J. Surg.* 16(1):35-41, 1973.

4451 CYSTIC DUCT REMNANT-DUODENAL FISTULA *(E.)* Van Houton, F. X.; Lewicki, A. M. (Harvard Med. Sch., Boston, Mass.). *Radiology* 107(1):75-76, 1973.

4452 VOLVULUS ASSOCIATED WITH MECKEL'S DIVERTICULUM IN THE HORSE. *(E.)* Grant, B. D.; Tennant, B. (Sch. Vet. Med., Univ. California, Davis). *J. Am. Vet. Med. Assoc.* 162(7):550-551, 1973.

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4456 STEATORRHOEA AND JEJUNAL RETICULUM CELL SARCOMA OCCURRING IN A PATIENT ON LONG-TERM COLCHICINE THERAPY FOR GOUT. *(E.)* Boucher, B. J.; Wright, J. T. (London Hosp., England). *Postgrad Med. J.* 49(568):106-107, 1973.

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4463 DUODENAL LEIOMYOSARCOMA PRESENTING AS A PULMONARY LESION. *(E.)* Bilton, J. L.; Lin, P. S.; Ram, M. D. (Huron Rd. Hosp., Cleveland, Ohio). *Am. Surg.* 39(3):290-298, 1973.

4464 RETROPERITONEAL RUPTURE OF DUODENUM WITH COMPLICATING GAS GANGRENE. *(E.)* Yeo, C. K.; McNamara, J. J. (Queen's Med. Ctr., Honolulu, Hawaii). *Arch. Surg.* 106(6):856-860, 1973.

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4466 MASSIVE DIGESTIVE BLEEDING CAUSED BY LEIOMYOMA OF THE SMALL INTESTINE. *(E.)* Lise, M.; Cagol, P. P.; Feltrin, P.; Pedrazzoli, S. (Inst. Gen. Surg. Clin. Surg. Ther., Univ. Padua, Italy). *Chir. Gastroenterol.* 6(4):379-387, 1972.

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4468 DUODENAL TELANGIECTASIS IN AN OCCULT GASTROINTESTINAL BLEEDER. *(E.)* Grotsky, H. W.; Waye, J. D. (Mt. Sinai Med. Sch., New York, N.Y.). *Gastrointest. Endosc.* 19(2):85, 1972.

4469 PRIMARY RETICULUM CELL SARCOMA OF THE CECUM. *(E.)* Sinha, S. N.; Gupta, R. K.; Kapur, B. M. L.; Chopra, P. (All-India Inst. Med. Sci., Ansari Nagar, New Delhi, India). *Int. Surg.* 58(4):264-266, 1973.

4470 ADENOCARCINOMA IN THE ILEUM OF A YOUNG DOG. *(E.)* Howard, D. R.; Schirmer, R. G.; Mostosky, U. V.; Michel, R. L. (Coll. Vet. Med., Michigan State Univ., East Lansing). *J. Am. Vet. Med. Assoc.* 162(11):956-958, 1973.

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4472 INTERNAL HERNIA THROUGH A MESOSALPINX DEFECT: A RARE CAUSE OF DISTAL MECHANICAL SMALL BOWEL OBSTRUCTION: CASE REPORT. *(E.)* Petereit, M. F. (Med. X-Ray Ctr., Sioux Falls, S.D.). *S.D. J. Med.* 26(5):44-45, 1973.

4473 INTESTINAL OBSTRUCTION INDUCED BY ANTICOAGULANTS: TWO CASES OF INTRAPARIETAL HEMATOMAS OF THE SMALL INTESTINE AND COLON. *(Fr.)* Stuckelberg, G.; Borgeaud, P. (Cantonal Hosp., Geneva, Switzerland). *Schweiz. Med. Wochenschr.* 103(1):9-15, 1973.

4474 INTRALUMINAL DUODENAL DIVERTICULUM. *(Ger.)* Sikora, J.; Mader, A.; Hefti, M.; Akovbiantz, A. (Waid Munic. Hosp., Zurich, Switzerland). *Schweiz. Med. Wochenschr.* 103(10):389-392, 1973.

See also, 4230, 4262, 4278, 4350, 4384, 4500, 4509, 4519, 4522, 4539, 4545, 4548, 4575, 4584, 4586, 4604, 4838, 4853, 4864, 4877, 4912, 4925, 4945.

SMALL INTESTINE

Regional Enteritis

4475 SMALL INTESTINAL ABSORPTIVE FUNCTION IN REGIONAL ENTERITIS. *(E.)* Gerson, C. D.; Cohen, N.; Janowitz, H. D. (Mt. Sinai Sch. Med., New York, N.Y.). *Gastroenterology* 64(5):907-912, 1973.

Small bowel absorption was investigated in 65 patients with regional enteritis in an effort to relate this to extent of disease or resection. In 26 patients no surgery had been performed, 7 had been operated upon without recurrence, 22 had significant recurrence after resection, and 10 were suffering from a markedly shortened bowel. Granulomatous colitis was present in 21 patients, and 8 additional patients had undergone subtotal or total colectomy; neither condition correlated with any abnormal absorption parameters. There was a close correlation between length of resected or diseased ileum and vitamin B_{12} and fat malabsorption. When the length of ileal dysfunction (resection + inflammation) exceeded 90 cm, the Schilling test was abnormal in 13 of 13 patients and steatorrhea became more marked. Patients with resection and postoperative recurrence had significantly lower fat and vitamin B_{12} absorption than those with disease and no surgery, reflecting the greater length of ileal dysfunction in the surgically treated group. The correlation between length of disease and/or resection was much less impressive for xylose than for either vitamin B_{12} or fat. Jejunal function as measured by D-xylose absorption was preserved in most patients. This supports the theory that it is ileal and not jejunal dysfunction which is responsible for steatorrhea in these patients.

4476 ADENOCARCINOMA OF THE SMALL BOWEL AS A COMPLICATION OF CROHN'S DISEASE. *(E.)* Frank, J. D.; Shorey, B. A. (Roy. United Hosp., Bath, England). *Gut* 14(2):120-124, 1973.

Adenocarcinomas developed in the terminal ileum of a 48-yr-old man and terminal ileum and cecum of a 54-yr-old woman 15 and 12 yr, resp. after a diagnosis of Crohn's disease had been established. In contrast to adenocarcinomas which develop in otherwise normal small intestine, those in Crohn's disease occur in younger patients, have a worse prognosis, and are twice as frequent in the ileum as in the jejunum. Eleven of the 30 reported adenocarcinomas in patients with Crohn's disease have been located in a bypassed segment of the intestine. Therefore, resection, rather than bypass, of the affected area is indicated for surgical therapy of Crohn's disease unless there are contraindications.

4477 LEUCOCYTE MIGRATION STUDIES WITH SPLEEN PREPARATIONS IN CROHN'S DISEASE. *(E.)* Richens, E. R.; Gough, K. R.; Williams, M. J. (Roy. United Hosp., Bath, England). *Gut* 14(5):376-379, 1973.

Using the leukocyte migration test, 39 patients with Crohn's disease, aged 17-70 yr (mean 35 yr), were tested for hypersensitivity to sarcoid and normal spleen suspensions; 17 normal age- and sex-matched subjects served as controls. Of the 39 patients, 22 had active and 17, quiescent Crohn's disease. No corticosteroids or azathioprin had been given to 26 patients. With sarcoid spleen no differences were found between leukocyte migration indices of controls and patients with Crohn's disease. Leukocyte migration was inhibited in 26% of patients with Crohn's disease. No relation was found between leukocyte migration inhibition and activity of the disease, length of history, or previous surgery. Migration stimulation, a phenomenon not observed among controls, occurred in 62% of patients with Crohn's disease. When patients on immunosuppressive therapy were excluded, migration stimulation occurred in 74%. In 4 untreated patients institution of immunosuppressants caused marked clinical improvement and, in 2 patients, normalization of the migration index. These findings suggest an immunological link between sarcoidosis and Crohn's disease.

4478 IS ACUTE TERMINAL ILEITIS A PRECURSOR OF CROHN'S DISEASE? *(E.)* Thomasson, B.; Havia, T. (Dept. Surg., Univ. Turku, Finland). *Acta Chir. Scand.* 139(2):192-193, 1973.

4479 REGIONAL ENTERITIS OF THE CECUM: A CLINICO-PATHOLOGICAL STUDY. *(E.)* Akagi, T.; Nikkaku, T.; Motoi, M.; Ogawa, K. (Okayama Univ. Med. Sch., Japan). *Acta Pathol. Jap.* 22(4):637-647, 1972.

4480 MASSIVE UPPER GASTROINTESTINAL HEMORRHAGE ASSOCIATED WITH CROHN'S DISEASE OF THE STOMACH AND DUODENUM: A CASE REPORT. *(E.)* Kim, U. S.; Zimmerman, M. J.; Weiss, M. (Mt. Sinai Sch. Med., City Univ. New York). *Am. J. Gastroenterol.* 59(3):244-249, 1973.

4481 GENITO-URINARY FISTULAE COMPLICATING CROHN'S DISEASE. *(E.)* Smith, P. J. B.; Williams, R. E.; DeDombal, A. T. (Dept. Urol., Leeds Univ., England). *Br. J. Urol.* 44(6):657-661, 1972.

4482 CROHN'S DISEASE OF THE STOMACH AND DUODENUM: REPORT OF A CASE. *(E.)* Roseman, D. M. (VA Hosp., San Diego, Calif.). *Gastrointest. Endosc.* 19(2):83-84, 1973.

4483 FREE PERFORATION IN CROHN'S DISEASE. *(E.)* Steinberg, D. M.; Cooke, W. T.; Alexander-Williams, J. (Gen Hosp., Birmingham, England). *Gut* 14(3):187-190, 1973.

4484 OPERATIVE TECHNIQUE IN SURGERY FOR CROHN'S DISEASE AND ITS RELATIONSHIP TO RECURRENCE. *(E.)* Colcock, B. P. (Lahey Clin. Fdn., Boston, Mass.). *Surg. Clin. N. Am.* 53(2):375-380, 1973.

4485 CROHN'S DISEASE OF THE MOUTH. *(E.)* Stankler, L.; Ewen, S. W. B.; Kerr, N. W. (Aberdeen Roy. Infirm., Scotland). *Br. J. Dermatol.* 87(5):501-504, 1972.

4486 CROHN'S DISEASE OF THE UPPER GASTROINTESTINAL TRACT. *(E.)* Haggitt, R. C.; Meissner, W. A. (New England Deaconess Hosp., Boston, Mass.). *Am. J. Clin. Pathol.* 59(5): 613-622, 1973.

4487 MALFUNCTION OF A COLOSTOMY IN A PATIENT WITH CROHN'S DISEASE. *(E.)* Schrock, T. R.; Dunphy, J. E. (Dept. Surg., Univ. California, San Francisco). *Calif. Med.* 118(3):44-46, 1973.

See also, 4261, 4417, 4491, 4492, 4509, 4512, 4527, 4530, 4545, 4590, 4845.

SMALL INTESTINE

Malabsorption

4488 NUTRITIONAL STATUS AND INTESTINAL FUNCTION AMONG RURAL POPULATIONS OF THE WEST INDIES. III. BARRIO CABRETO, DOMINICAN REPUBLIC. *(E.)* Klipstein, F. A.; Rubio, C.; Montas, S.; Tomasini, J. T.; Castillo, R. G. (Univ. Rochester Med. Ctr., N.Y.). *Am. J. Clin. Nutr.* 26(1): 87-94, 1973.

Dietary intake, nutritional status, and intestinal structure and function were evaluated in 42 subjects selected as representative on the basis of age and sex of a rural barrio in the Dominican Republic. Mean dietary intake among the group studied was 35 g protein and 54 g fat/day. Twenty (47%) subjects had a deficiency of one or more nutrients, including iron (13), folate (6), vitamin B_{12} (4), albumin (1), carotene (3), and cholesterol (9). Anemia existed in 11 cases. Twenty-three subjects had either one (41%) or multiple (14%) abnormalities of intestinal function. These included xylose absorption (19), fecal fat excretion (1), nitrogen excretion (1), and vitamin B_{12} absorption (11). Intestinal morphology was examined in 32 cases. In 2, the structure was normal; in 8, mild 1+ changes were present; in 20, moderate 2+ abnormalities were present; and in 2, severe 3+ abnormalities were present. Iron deficiency could be attributed to the excessive demands of previous multiple pregnancies in most instances. On the other hand, malabsorption appeared to be a factor in the pathogenesis of deficiency of other nutrients found present in 13 subjects. All 4 persons deficient in vitamin B_{12} had impaired absorption of this vitamin, and 9 of the 12 persons who had a deficiency of either folate, albumin, carotene, or cholesterol had subnormal absorption of xylose. Among the 36 subjects who had normal absorption of xylose, only 3 (8%) had a deficiency of one or more of these nutrients, whereas 7 (88%) of the 8 persons who had xylose absorption of less than 4 g/5 hr had a deficiency. Ova of *Trichuris trichiura* were present in 11 cases, and *Ascaris lumbricoides* in 3 (combined with *Trichuris trichiuria* in 2 and *Necator americanus* in 2). These observations indicate that the marginal dietary intake consumed only rarely resulted in deficiency states other than that of iron. However, when the supplemental factor of impaired intestinal absorption is added, deficiencies develop in a large proportion of such individuals.

4489 INTESTINAL MALABSORPTION IN INFANTS WITH HISTIOCYTOSIS X. *(E.)* Keeling, J. W.; Harries, J. T. (Hosp. Sick Children, London, England). *Arch. Dis. Child.* 48(5):350-354, 1973.

A 6-week-old girl was hospitalized with histiocytosis X and increased fecal fat excretion (mean 5.9 g/day). A low fat and disaccharide-free diet supplemented with medium-chain triglycerides improved stool consistency and frequency. Impaired intestinal function may have contributed to a fall in serum proteins. *Escherichia coli* was cultured from a stool a few days before death which occurred 7 weeks after admission. Necropsy revealed an enlarged liver and spleen. Histological studies showed loss of villous pattern in the duodenum and jejunum. Dense infiltration of the lamina propria by abnormal histiocytes had occurred although the epithelium remained normal. There was focal histiocytic infiltration of the submosa. Localized areas of mucosal and submucosal infiltration were observed in the ileum. It is suggested that the mesenteric lymph node involvement with lymphatic obstruction may interfere with absorption of lipids, and bacterial infections of the gastrointestinal tract in such debilitated infants could cause diarrhea. The frequent association of diarrhea and mucosal infiltration by histiocytes suggests that such cellular infiltration may itself impair intestinal function.

4490 DRUG ABSORPTION IN PATIENTS WITH INTESTINAL VILLOUS ATROPHY. *(E.)*

Mattila, M. J.; Jussila, J.; Takki, S. (Dept. Pharmacol., Univ. Helsinki, Finland). *Arzneim. Forsch.* 23(4): 583-585, 1973.

Patients with small intestinal villous changes (5 men and 5 women, aged 19-60 yr) and 10 healthy controls matched for age and sex, who all had normal hepatic and renal functions, were subjected to drug absorption studies. All patients had morphological changes in their small-intestinal biopsy, and 8 had pathologically low absorption of d-xylose, fat, or both. Absorption of isoniazid (10 mg/kg), chloramphenicol (2 g), salicylate (1 g), and cycloserine (500 mg) in patients with villous changes was similar to that measured in controls. The sulphafurazole (500 mg) absorption was retarded in patients, as indicated by low initial serum levels and by reduced excretion of sulpha in the 4-hr urine. Since sulfafurazole, but not isoniazid or cycloserine, absorption was retarded, this impaired absorption may not be due to changes in water fluxes across the intestinal wall. The sensitivity of sulfafurazole to pH combined with irregular gastric emptying times explains its retarded absorption. Quinine (600 mg) produced elevated serum levels in patients, the rise being attributed to their lower body weight due to less subcutaneous fat. These data suggest that intestinal drug absorption by passive diffusion may remain largely unaltered when histological evidence and/or abnormal absorption test results indicate intestinal injury. Therefore, an adequate amount of well perfused mucosal surface must remain in spite of villous atrophy since the intestinal blood flow rate is the limiting factor for intestinal drug absorption.

4491 ROLE OF BILE ACID MALABSORPTION IN PATHOGENESIS OF DIARRHEA AND STEATORRHEA IN PATIENTS WITH ILEAL RESECTION. I. RESPONSE TO CHOLESTYRAMINE OR REPLACEMENT OF DIETARY LONG CHAIN TRIGLYCERIDE BY MEDIUM CHAIN TRIGLYCERIDE. *(E.)*

Hofmann, A. F.; Poley, J. R. (Mayo Clin., Rochester, Minn.). *Gastroenterology* 62(5):918-934, 1972.

The effect of cholestyramine (4 g, 15 min before each meal and before bedtime), long-chain triglyceride, and equicalorically substituted medium-chain triglyceride was studied on fecal fat, bile acids, and electrolytes in 24-hr stool specimens from 9 and electrolytes in 24-hr stool specimens from 9 patients who had undergone ileal resection for a variety of conditions. These patients included 6 with diarrhea, resections of less than 100 cm, and mild steatorrhea of less than 20 g/day. Schilling tests were normal in 3 of these 6 patients. The remaining 3 patients had more extensive resections, diarrhea, significantly more severe steatorrhea, and vitamin B_{12} malabsorption. During administration of long-chain triglyceride all patients had acid malabsorption, excreting more than 75% of ^{14}C-labeled taurocholate within 24 hr, and synthesizing 10-20 times the normal amount of bile acids. Patients with mild steatorrhea had greatly increased concentrations of bile acids in fecal water. Administration of cholestyramine significantly decreased fecal weight, frequency, Na$^+$ excretion, and the concentration of bile acid in fecal water. These observations demonstrated that bile acids induce water and electrolyte secretion by the colon and that the main cause of diarrhea in these patients was increased passage of bile acids into the colon. Cholestyramine caused a further increase in bile acid synthesis to 0.1-0.3 mM/kg/day. Fat malabsorption had little effect on the diarrhea since diarrhea persisted during administration of medium-chain triglyceride when steatorrhea disappeared. In patients with more severe steatorrhea, fat malabsorption appeared to be the main cause of diarrhea, since replacement of long-chain by medium-chain triglyceride decreased fecal weight, Na$^+$ and K$^+$, and significantly reduced fecal fat. Unabsorbed fatty acids were partially converted to hydroxy fatty acids by intestinal bacteria, and unabsorbed fatty acids, hydroxy fatty acids, or both appeared to contribute to the diarrhea. Since there was no response to cholestyramine and the concentration of bile acids in fecal water was low, bile acid malabsorption appeared to play no direct role in the diarrhea of 2 of these 3 patients. However, jejunal bile acid concentrations were decreased in 2 of the 3 patients, and the resulting decrease in fat digestion together with the decreased mucosal surface probably accounted for the high fecal fat concentrations.

4492 IMPAIRED FOLIC ACID ABSORPTION IN INFLAMMATORY BOWEL DISEASE: EFFECTS OF SALICYLAZOSULFAPYRIDINE (AZULFIDINE) *(E.)*

Franklin, J. L.; Rosenberg, I. H. (Pritzker Sch. Med., Chicago, Ill.). *Gastroenterology* 64(4):517-525, 1973.

A high prevalence of folate deficiency, as manifested by low serum folates (63%) and macrocytosis (10%) was found in 19 patients, aged 16-63 yr, hospitalized for inflammatory bowel disease. Absorption studies utilizing tritiated folic acid in 9 patients with ulcerative colitis, 8 with granulomatous colitis, and 2 with ulcerative proctitis revealed impaired absorption of monoglutamic folate. Prednisone therapy did not influence folate absorption. Analysis of absorption studies performed sequentially indicated further reduction in folate absorption associated with this drug. Oral folic acid tolerance tests confirmed the observation that Azulfidine impaired intestinal folate absorption; the mean decrease was 24.1%. *In vitro* experiments with isolated rat intestine have shown that the inhibitory effect is specific for salicylazosulfapyridine and is not seen with its primary cleavage products, sulfapyridine and 5-aminosalicyclic acid. Malabsorption of folic acid is presented as another facet of jejunal dysfunction seen in inflammatory bowel disease. Surveillance of folate status and correction of subclinical folic acid deficiency may be important in the treatment of these patients.

4493 INTESTINAL MALABSORPTION IN FOLATE-DEFICIENT ALCOHOLICS. *(E.)* Halsted, C. H.; Robles, E. A.; Mezey, E. (Baltimore City Hosp., Md.). *Gastroenterology* 64(4):526-532, 1973.

To evaluate the relation of malnutrition and absorption in alcoholics, intestinal absorption was studied in 4 male chronic alcoholics, aged 39-59 yr, placed on a folate-deficient diet with ethanol. Intestinal absorption was measured by conventional means and by triple lumen perfusion of the jejunum. In 2 patients ingestion of ethanol (200 g/day) with a low folate diet, was followed by decreased absorption of d-xylose, labeled folic acid (^{3}H-pteroylglutamic acid), glucose, fluid, and sodium. Absorption of each substance improved with folic acid supplementation in spite of continued ingestion of ethanol. Mild net secretion of fluid and sodium into the intestinal lumen was observed in a patient who remained sober on the low folate diet and in a patient who ingested ethanol (300 g/day) with a regular diet. The morphology of the jejunal mucosa was not affected. In 2 patients made folate-deficient while ingesting ethanol, decreased intestinal absorption was observed while intestinal biopsy was normal. This suggests a functional abnormality may precede morphological changes in the jejunum in dietary folate deficiency. These preliminary data suggest that the combination of dietary folate deficiency and prolonged ethanol intake results in intestinal malabsorption of several water-soluble substances, which may account in part for the poor nutrition often found in periodic heavy drinkers.

4494 GENETICS OF PRIMARY ADULT LACTASE DEFICIENCY. *(E.)* Gilat, T.; Benaroya, Y.; Gelman-Malachi, E.; Adam, A. (Ichilov Hosp., Tel-Aviv, Israel). *Gastroenterology* 64(4):562-568, 1973.

Lactase deficiency was found in 105 of 167 subjects over 12 yr old from 32 unrelated Jewish families in Israel. Most of these subjects consumed less than 1 glass of milk/day for many years. A maximal glucose increase of less than 20 mg/100 ml during the lactose tolerance test was considered diagnostic for primary adult lactase deficiency. Most subjects with lactase deficiency developed symptoms (abdominal pain, borborygmus, and abdominal distension with gas) after lactose ingestion, while most of those with normal lactose tolerance tests did not. The development of symptoms was not related to sex or age. Analysis of data in 30 sets of parents and their 88 offspring showed a significantly nonrandom distribution of lactase deficiency among the offspring, depending upon the parental phenotype. However, 4 normal offspring were found in 2 of 11 families in which both parents had lactase deficiency, and lactase deficient offspring were found in 2 families in which both parents were normal. These results support the hereditary transmission of lactase deficiency, but no simple mechanism can account for all of the findings.

4495 DISCORDANCE FOR CHILDHOOD COELIAC DISEASE IN MONOZYGOTIC TWINS. *(E.)* Walker-Smith, J. A. (Roy. Alexandra Hosp. Children, Camperdown, Australia). *Gut* 14(5):374-375, 1973.

Discordance for childhood celiac disease in monozygotic twin boys is reported. The diagnosis of celiac disease in the second-born twin was established at the age of 11 months by demonstration of a flat small intestinal mucosa on biopsy and clinical response to a gluten-free diet. The first-born twin had a normal small intestinal mucosa. Phenotypic, genotypic, and dermatoglyphic observations as well as gross observation of the placenta and membranes provided strong evidence that these twin boys were monozygotic. This case supports the view that celiac disease is probably not due to a genetically determined enzyme deficiency nor is it inherited as a dominant gene with incomplete penetrance. It is suggested that the genetic component of celiac disease is a susceptibility to damage by various factors, and this susceptibility is inherited as a polygenetic variation.

4496 RETICULIN ANTIBODY IN CHILDREN WITH MALABSORPTION. *(E.)* Von Essen, T.; Savilahti, E.; Pelkonen, P. (Children's Hosp., Univ. Helsinki, Finland). *Lancet* (7761):1157-1159, 1972.

A retrospective study for reticulin antibody by indirect immunofluorescence was conducted on 40 children, 6 months to 14 yr old, with celiac disease. Prior to gluten withdrawal 27 (68%) had antibody in their sera. In some cases antibody titer fluctuated according to gluten withdrawal and provocation. In 20 cases of malabsorption syndrome with cow's milk intolerance, histologically and clinically indistinguishable from celiac disease, reticulin antibody was not detected. The absence of reticulin antibody in patients with malabsorption of cow's milk indicates that this antibody is not correlated with damage of the intestinal mucosa. When positive, the reticulin-antibody test should be of clinical value in differential diagnosis. Of the reticulin-antibody-positive cases of celiac disease, 2 lacked IgA in their sera. The antibody was found in 4 of 23 children lacking IgA but with normal jejunal structure.

4497 DISACCHARIDASE ACTIVITY AND JEJUNAL MORPHOLOGY IN COELIAC DISEASE. *(E.)* Pena, A. S.; Truelove, S. C.; Whitehead, R. (Radcliffe Infirm., Oxford, England). *Q. J. Med.* 41(164):457-476, 1972.

In the present study 45 patients with untreated celiac disease were studied by jejunal biopsy. All had a jejunal mucosa which appeared flat under the dissecting microscope, and all showed severe villous atrophy and crypt hyperplasia on light microscopy. The activities of all disaccharidases were much lower than those in healthy volunteers. In 10 of these patients, jejunal biopsy was repeated at least once after they had been placed on a gluten-free diet and were adhering strictly to it. All showed evidence of morphological recovery. Maltase and sucrase usually reached normal levels of activity within a few months. The response of lactase varied from full recovery in a few months to remaining severely depressed for years. Patients less than 30 yr old usually recovered completely in a few months. Most of the older patients showed little or no recovery during this period. The effect of a 2-month course of corticosteroids was studied in an elderly woman who had shown an excellent clinical response to a gluten-free diet but in whom the jejunal mucosa remained morphologically abnormal and with severely depressed disaccharidase activity. There was morphological improvement and enhanced disaccharidse activity, but reversion occurred after cessation of corticosteroid treatment. Prolonged follow-up with repeated jejunal biopsy showed a very slow morphological and enzymatic recovery. In 2 patients who had made a perfect clinical, morphological, and enzymatic recovery on a gluten-free diet, the effect of reintroducing ordinary bread into the diet was studied by serial biopsy. Both showed a rapid morphological deterioration of the jejunal mucosa accompanied by severe depression of disaccharidase activity. Neither experienced any symptoms while this histological and biochemical disturbance was occurring. Subsequent return to a gluten-free diet was followed by evidence of recovery. These observations demonstrate that, although a patient with celiac disease may be able to tolerate gluten from a symptomatic viewpoint, the gluten always damages the jejunal mucosa. Consequently patients with celiac disease should remain permanently on a gluten-free diet.

4498 THE CORRECTION OF POST GASTRECTOMY MALABSORPTION BY JEJUNAL INTERPOSITION. *(E.)* Fineberg, C.; Templeton, J. Y.: Wirts, C. W.; Goldstein, F. (Jefferson Med. Coll., Philadelphia, Pa.). *Surg. Clin. N. Am.* 53(3):581-592, 1973.

A segment of jejunum was interposed isoperistaltically between the gastric remnant and the duodenal stump for the correction of postgastrectomy steatorrhea in 9 patients (7 men and 2 women, aged 29-61 yr). Subtotal gastrectomy with a Billroth II gastrojejunostomy had been performed earlier on 8 patients; 1 had had a gastrojejunostomy with vagotomy without resection. All suffered from malabsorption, and 5 had intractable anemia. Dramatic improvement was achieved in all manifestations of malabsorption such as cheilosis, glossitis, edema, neurologic defects, discoloration of the hair, profound weight loss, and anemia. Improvement started within 2 weeks after surgery. It is important to keep the interposed jejunal segment short to eliminate recurrence of stasis in the afferent limb. Excellent results were obtained using a 4-inch segment which was placed on moderate stretch.

4499 LACTOSE INTOLERANCE IN NIGERIAN CHILDREN. *(E.)* Olatunbosun, D. A.; Adadevoh, B. K. (Dept. Chem. Pathol., Univ. Ibadan, Nigeria). *Acta Paediatr. Scand.* 61:715-719, 1972.

4500 EHLERS-DANLOS SYNDROME WITH MEGADUODENUM AND MALABSORPTION SYNDROME SECONDARY TO BACTERIAL OVERGROWTH: A REPORT OF THE FIRST CASE. *(E.)* Hines, Jr., C.; Davis, Jr., W. D. (Ochsner Clin., New Orleans, La.). *Am. J. Med.* 54(4):539-543, 1973.

4501 QUANTITATIVE CHANGES IN SERUM PROTEIN FRACTIONS DURING THE DEVELOPMENT OF KWASHIORKOR AND IN RECOVERY. *(E.)* Coward, W. A.; Whitehead, R. G.; Coward, D. G. (Med. Res. Council, Child Nutr. Unit, Kampala, Uganda). *Br. J. Nutr.* 28(3):433-441, 1972.

4502 CHANGES IN HAEMOGLOBIN CONCENTRATIONS DURING THE DEVELOPMENT OF KWASHIORKOR. *(E.)* Coward, W. A.; Whitehead, R. G. (Med. Res. Council, Child Nutr. Unit, Kampala, Uganda). *Br. J. Nutr.* 28(3):463-471, 1972.

4503 INCIDENCE OF COELIAC DISEASE IN THE WEST OF IRELAND. *(E.)* Mylotte, M.; Egan-Mitchell, B.; McCarthy, C. F.; McNicholl, B. (Reg. Hosp., Galway, Eire). *Br. Med. J.* 1(5855): 703-705, 1973.

4504 ACTIVITIES OF BRUSH BORDER LACTASE, ACID β-GALACTOSIDASE, AND HETERO-β-GALACTOSIDASE IN THE JEJUNUM OF THE ZAMBIAN AFRICAN. *(E.)* Cook, G. C.; Asp, N. G.; Dahlqvist, A. (Dept. Med., Univ. Zambia, Lusaka). *Gastroenterology* 64(3):405-410, 1973.

4505 A PRACTICAL APPROACH TO THE DIAGNOSIS AND TREATMENT OF INTESTINAL MALABSORPTION. *(E.)* Cianfichi, R. J.; Banwell, J. G. (Univ. Kentucky Med. Ctr., Lexington). *Ky. Med. Assoc.* 71(4):244-245, 1973.

4506 ELECTRON MICROSCOPE STUDIES OF THE SMALL INTESTINE MUCOSA IN VARIOUS DISEASES. *(Ger.)* Knust, F. J.; Roberts, D. M.; Themann, H. (Inst. Med. Phys., Westphalian Wilhelms Univ., Munster, Germany). *Med. Welt* 23(9):291-297, 1972.

4507 ENDOGENOUS AMINO ACID LOSS AND ITS SIGNIFICANCE IN INFANTILE DIARRHEA. *(E.)* Ghadimi, H.; Kumar, S.; Abaci, F. (Methodist Hosp., Brooklyn, N.Y.). *Pediatr. Res.* 7(3):161-168, 1973.

4508 POSTINFECTIVE MALABSORPTION: A SPRUE SYNDROME. *(E.)* Montgomery, R. D.; Beale, D. J.; Sammons, H. G.; Schneider, R. (East Birmingham Hosp., England). *Br. Med. J.* 2(5861):265-268, 1973.

4509 MALNUTRITION AND MALABSORPTION IN CROHN'S DISEASE WITH REFERENCE TO THE EFFECT OF SURGERY. *(E.)* Dyer, N. H.; Dawson, A. M. (St. Bartholomew's Hosp., London, England). *Br. J. Surg.* 60(2):134-140, 1973.

4510 MYCOTIC FLORAL PATTERN OF THE SMALL INTESTINE IN TROPICAL SPRUE. *(E.)* Mazumder, D. N. G.; Mitra, R.; Banwell, J. G.; Chaudhuri, S.; Nandi, P. (Infect. Dis. Hosp., Calcutta, India). *Calcutta Med. J.* 69(1):1-7, 1972.

4511 TROPICAL ENTEROPATHY. *(E.)* Lindenbaum, J. (Harlem Hosp. Ctr., New York). *Gastroenterology* 64(4):637-652, 1973.

4512 ANTIRETICULIN ANTIBODY: INCIDENCE AND DIAGNOSTIC SIGNIFICANCE. *(E.)* Seah, P. P.; Ery, L.; Holborow, E. J.; Rossiter, M. A.; Doe, W. F.; Magalhaes, A. F.; Hofbrand, A. V. (St. Mary's Hosp., London, England). *Gut* 14(4): 311-315, 1973.

4513 DISODIUM CROMOGLYCATE IN GASTROINTESTINAL PROTEIN INTOLERANCE. *(E.)* Freier, S.; Berger, H. (Shaare Zedek Gen. Hosp., Jerusalem, Israel). *Lancet* (7809):913-915, 1973.

4514 BUTTER FAT ABSORPTION TEST IN THE DIAGNOSIS OF MALABSORPTION IN CHILDREN. *(Ser.)* Filipovic, D.; Subotic, Z. (Serbian Youth Welfare Inst., Belgrade, Yugoslavia). *Srp. Arh. Celok. Lek.* 100(2):225-232, 1972.

4515 EXCRETION OF CATECHOLAMINES AND CATECHOLAMINE METABOLITES IN KWASHIORKOR. *(E.)* Hoeldtke, R. D.; Wurtman, R. J. (Dept. Nutr. Food Sci., Massachusetts Inst. Technol., Cambridge). *Am. J. Clin. Nutr.* 26(2):205-210, 1973.

4516 PREGNANCY AND LACTOSE INTOLERANCE. *(E.)* Paige, D. M.; Bayless, T. M.; Graham, G. G. (Johns Hopkins Med. Inst., Baltimore, Md.). *Am. J. Clin. Nutr.* 26(3):238-240, 1973.

4517 PANCREAS IN PRIMARY MALNUTRITION DISORDERS. *(E.)* Pitchumoni, C. S. (New York Med. Coll., Metropolitan Hosp. Ctr., N.Y.). *Am. J. Clin. Nutr.* 26(3):374-379, 1973.

4518 GASTROILEOSTOMY LEADING TO SEVERE POTASSIUM DEPLETION AND RENAL TUBULAR ACIDOSIS. *(E.)* Kovnat, P. J.; Tin, A. D. (Philadelphia VA Hosp., Med. Coll. Pennsylvania Div., Pa.). *Am. J. Gastroenterol.* 59(4):340-347, 1973.

4519 ADIPOSITY OF SMALL INTESTINAL SUBMUCOSA ASSOCIATED WITH MALABSORPTION. *(E.)* Levine, S.; Misra, P. (Bird S. Coler Hosp., Welfare Island, N.Y.). *Arch. Pathol.* 95(6): 416-418, 1973.

4520 PROGRESSIVE CHANGES IN SERUM CORTISOL, INSULIN AND GROWTH HORMONE CONCENTRATIONS AND THEIR RELATIONSHIP TO THE DISTORTED AMINO ACID PATTERN DURING THE DEVELOPMENT OF KWASHIORKOR. *(E.)* Lunn, P. G.; Whitehead, R. G.; Hay, R. W.; Baker, B. A. (Med. Res. Council Child Nutr. Unit., Kampala, Uganda). *Br. J. Nutr.* 29(3):399-422, 1973.

4521 THE HAEMATOLOGICAL RESPONSE TO A GLUTEN FREE DIET IN ADULT COELIAC DISEASE WITH TRIPLE DEFICIENCY ANEMIA. *(E.)* Fielding, J. F.; Badenoch, J. (Radcliffe Infirm., Oxford, England). *J. Ir. Med. Assoc.* 66(8):213-214, 1973.

4522 THE MECHANISM OF VITAMIN B_{12} MALABSORPTION IN BLIND-LOOP SYNDROME. *(E.)* Schjonsby, H. (Haukeland Hosp., Bergen, Norway). *Scand. J. Gastroenterol.* 8(2):97-99, 1973.

See also, 4357, 4366, 4419, 4422, 4424, 4456, 4471, 4475, 4603, 4612, 4639, 4864, 4888, 4913, 4914.

LARGE INTESTINE

4523 LOCALIZED GIANT PSEUDOPOLYPOSIS. A COMPLICATION OF GRANULOMATOUS COLITIS. *(E.)* Schneider, R.; Dickersin, G. R.; Patterson, J. F. (Tufts-New England Med. Ctr., Boston, Mass.). *Am. J. Dig. Dis.* 18(4):265-270, 1973.

A 60-yr-old woman with a history of duodenal ulcer, anorectal fistulas, and occasional diarrhea was hospitalized with nausea and epigastric discomfort. Barium enema showed a moderately obstructing, villose lesion in the distal transverse colon and

2 small polypoid lesions distal to the splenic flexure. Resection of a segment of colon revealed one large (5 x 7 cm) and 5 smaller polypoid lesions. Histological examination showed unulcerated mucosa along with varying degrees of inflammation, and focal, punctate ulceration. Some polyps exhibited only mild chronic inflammation of the lamina propria with normal glands, while others displayed severe ulceration of the lamina propria and underlying submucosa by acute and chronic inflammatory cells with focal necrosis and hemorrhage. Some glands were dilated and filled with polymorphonuclear cells and necrotic debris; lining cells were focally necrotic or hyperplastic. Some inflamed glands and crypt abscesses extended deep into the focally destroyed muscularis mucosa which had only a few narrow columns of chronic inflammatory cells extending through it. Because of the segmental nature of the lesions, sparing of the rectum, and the history of perianal fistulas, the underlying disease is considered to be granulomatous colitis. This case of segmental giant pseudopolyps is an unusual response to granulomatous colitis; only 4 cases have been previously reported.

4524 COLORECTAL CARCINOMA AT THE LAHEY CLINIC, 1962 TO 1966. *(E.)* Corman, M. L.; Swinton, N. W.; O'Keefe, D. D.; Veidenheimer, M. C. (Lahey Clin. Fdn., Boston, Mass.). *Am. J. Surg.* 125(4):424-428, 1973.

The operability rate of carcinoma of the colon and rectum was 98% in 513 patients (267 men and 246 women, aged 22-99 yr) treated between 1962 and 1966. The site of the lesions included: rectum (237 patients), sigmoid colon (105), ascending colon (93), transverse colon (44), descending colon (32), and anal canal (2). The rate of resection was 94%; operative mortality was 4.5%. The uncorrected 5-yr survival rate for those undergoing surgery was 62%. The uncorrected survival rates for Dukes' lesions A, B, and C were 84, 65, and 36%, resp.; the corrected survival rates were 98, 79, and 42%, resp. Decreased survival is noted with increased lymph node involvement and with the presence of blood vessel invasion.

4525 GENETICS AND COLON CANCER. *(E.)* Lynch, H. T.; Guirgis, H.; Swartz, M.; Lynch, J.; Krush, A. J.; Kaplan, A. R. (Creighton Univ. Sch. Med., Omaha, Neb.). *Arch. Surg.* 106(5):669-675, 1973.

The genealogy and all histologic varieties of cancer were established for probands and their first-degree relatives in a retrospective study (98 colon cancer probands) and a prospective study (50 colon cancer probands) with carefully matched controls for the prospective series. Results revealed site-specific colon cancer, breast cancer, and multiple primary malignant neoplasms occurred in significant excess among first-degree relatives of colon cancer probands in the experimental groups when compared with those in the control group. Colon cancer was found in 23 first-degree relatives of the 98 colon cancer probands in the retrospective series and in 15 first-degree relatives of the 50 colon cancer probands in the prospective series. Only 3 cases of colon cancer were found in the control group. Similar observations suggest that a familial factor is etiologic for colon cancer, breast cancer, and multiple primary malignancies in certain families. The mechanism may be gene transmitted, associated with a familial-occurring oncogenic virus, or other nongenetic or familial agent, or a combination of these factors. It is possible that the gene(s) predisposing to cancer may cause a mutation in a particular cell, which may render this specific cell susceptible to malignant transformation through interaction with a carcinogen such as an oncogenic virus.

4526 COLONIC ABSORPTION IN IDIOPATHIC CONSTIPATION. *(E.)* Devroede, G.; Soffie, M. (Unit Gastroenterol. Res., Univ. Sherbrooke, Canada). *Gastroenterology* 64(4):552-561, 1973.

A group of 9 patients, aged 15 to 31, fulfilling the criteria for idiopathic constipation, and 26 healthy volunteers were studied by colonic perfusion. Mean transit times of solutions infused at 10 and 16 ml/min were 83 and 53 min resp. in patients with constipation, and 40 and 29 min resp. in control subjects. Colonic volumes during these perfusions were 485 and 604 ml resp. in patients, and 351 and 397 ml resp. in control subjects. Although total net absorption of water and sodium was greater in constipation, when rates of absorption were corrected for transit times, constipated subjects absorbed water and sodium at a slightly lower rate than controls. In another part of the protocol, transit time was studied by the use of radio-opaque markers and was found to be markedly slower in constipated patients. It took constipated patients 2 1/2 times longer to eliminate 50% of the markers. Increased water absorption in the colon of patients suffering from idiopathic constipation appears to be related to delayed transit, rather than to altered mucosal function. It is possible to speculate that a degree of anorectal obstruction could be responsible for all the observed findings.

4527 PERFORATED NONGRANULOMATOUS APPENDICITIS IN THE COURSE OF REGIONAL ILEITIS. *(E.)* Korelitz, B. I.; Sommers, S. C. (Lenox Hill Hosp., New York, N.Y.). *Gastroenterology* 64(5):1020-1025, 1973.

The first report is presented for ordinary, nongranulomatous appendicitis with perforation in a 32-yr-old man who had a 6-yr history of regional ileitis. X-rays showed stricture of at least 1 foot of terminal ileum with nodular but distensible bowel for 6 inches proximal to that. Salicylazosulfapyridine resulted in temporary improvement but the patient was hospitalized when symptoms developed which were suggestive of a peri-ileal abscess involving the bladder, sigmoid, or both.

Prednisone (60 mg/day p.o.) was initiated at this time. Surgical exploration revealed generalized peritonitis. The ileum was acutely and chronically inflamed and the distal foot displayed changes of typical ileitis. The tip of the appendix was perforated and adhered to the terminal ileum. A side-to-side ileo-ascending colostomy and appendectomy were performed. No granulomata, lymphangiectasia, lymph nodes, or other stigmata of regional enterocolitis were found in the appendix. Postoperative complications included a generalized cutaneous drug eruption, left subphrenic abscess with associated left pleural effusion, and a pelvic abscess leading to a fecal fistula. The patient later underwent excision of the bypassed cecum and terminal ileum and the fecal fistula, which was located in the ileum about 2 feet from the ileocecal valve. Appendicitis apparently had its onset during the 2 weeks prior to hospitalization; perforation probably occurred soon after admission, but some of its clinical manifestations were masked by the prednisone. This case supports the argument for performing an appendectomy, if feasible, when ileitis is diagnosed at surgery.

4528 THE SPECIFICITY OF CARCINO-FOETAL ANTIGENS OF THE HUMAN DIGESTIVE-TRACT TUMOURS. *(E.)* Martin, F.; Martin, M. S.; Bordes, M.; Bourgeaux, C. (Fac. Med., Dijon, France). *Eur. J. Cancer* 8:315-321, 1972.

By the immunization of rabbits with human colonic adenocarcinoma, a carcinofetal antigen, identical to Gold's carcinoembryonic antigen, may be demonstrated. After absorption by homologous normal tissue, the antiserum reacts with saline extracts of digestive tumors of fetal gut, but not with noncancerous adult tissue. However, the more sensitive techniques, precipitation and precipitin-inhibition reaction with perchloric extracts, immunofluorescence, and radioimmunoassay, can detect small amounts of the same antigen in non-cancerous adult colon. Thus, the carcinoembryonic antigen seems not to be cancer specific. However, a definite quantitative difference may be demonstrated between cancerous and noncancerous intestine and this difference is sufficient to be useful for diagnostic purposes. Other carcinofetal antigens of the human digestive system, α-fetoprotein of hepatoma and fetal sulphoglycoprotein of gastric carcinoma, seem also to have been detected where fetal or cancerous conditions do not prevail.

4529 THE EFFECT OF PERFUSION ON THE FLORA OF THE EXCLUDED COLON. *(E.)* Vince, A.; Bown, R.; O'Grady, F.; Dawson, A. M. (St. Bartholomew's Hosp., London, England). *Gut* 14(3):178-182, 1973.

The bacterial flora of excluded colonic segments of 3 patients with chronic hepatic encephalopathy has been examined in the normal resting state and after perfusion of the colonic segment with a phosphate-buffered, protein-free solution (pH 7.2-8.9). The flora of the excluded colon was substantial and was qualitatively similar to that of feces. Perfusion for 2 hr at 10 ml/min usually reduced counts of organisms present in the issuing effluent by 1-1½ logs in 2 patients, but rises in the counts of *Proteus mirabilis*, enterococci, lactobacilli, and bacteroides were recorded from the third patient. Prolonged rapid perfusion (50 ml/min for 1 hr) or the inclusion of antibiotics in the perfusion solution (80 mg neomycin and 20 mg lincomycin/liter) was necessary to obtain a substantial reduction in counts. Rapid perfusion resulted in the appearance of organisms that had not been recovered during slower perfusions.

4530 RECTAL ELECTROLYTE TRANSPORT AND MUCOSAL PERMEABILITY IN ULCERATIVE COLITIS AND CROHN'S DISEASE. *(E.)* Rask-Madsen, J.; Hammersgaard, E. A.; Knudsen, E. (Glostrup Hosp., Copenhagen, Denmark). *J. Lab. Clin. Med.* 81(3):342-353, 1973.

The inflamed rectal stump of 11 patients (8 female and 3 male, aged 26-58 yr) who had undergone complete colectomy for proximal inflammatory bowel disease was perfused *in situ* with isotonic sodium chloride solutions or isotonic mixtures of saline, potassium, and bicarbonate. Unidirectional fluxes of sodium and the net fluxes of sodium, chloride, potassium, bicarbonate, and water were determined in these patients and in 6 healthy controls, whereas estimations of the diffusional permeability coefficient of urea, fructose, ^{51}Cr ethylene diaminetetraacetic acid, ^{57}Co-vitamin B_{12}, and ^{125}I-polyvinylpyrrolidone were made in the patients only. The mean absorptive capacity for sodium, chloride, and water was significantly increased in all patients, but the electrolyte transfer in one patient, who was in complete remission, did not differ from that of control subjects. The electrolyte transport pattern in inflammatory bowel disease was the same as in the normal rectum and colon. Thus, net water transport was dependent on net sodium absorption while bicarbonate secretion balanced the chloride ions absorbed in excess of sodium. Potassium was secreted into the rectal lumen, even when the luminal concentration exceeded that of blood. The mucosa-to-serosa flux of sodium was significantly reduced, but a decreased sodium flux ratio found in patients with active disease was due to an increased serosa-to-mucosa flux of sodium, suggesting that defective absorption may result from sodium already "pumped" leaking out into the gut lumen. The relatively constant relationship between the diffusional permeability coefficients of the named uncharged hydrophilic solutes and their respective free diffusion coefficients in water supports the hypothesis of increased permeability of the epithelium in active disease.

4531 HUMAN AMEBIC DYSENTERY: ELECTRON MICROSCOPY OF ENTAMOEBA HISTOLYTICA CONTACTING, INGESTING, AND DIGESTING INFLAMMATORY CELLS. *(E.)* Griffin, J. L. (Armed Forces Inst. Pathol., Washington, D.C.). *Am. J. Trop. Med. Hyg.* 21(6):895-906, 1972.

4532 GASTROINTESTINAL POLYPECTOMY VIA THE FIBERENDOSCOPE. *(E.)* Gaisford, W. D. (Latter-day Saints Hosp., Salt Lake City, Utah). *Arch. Surg.* 106(4):458-462, 1973.

4533 ISCHEMIC COLITIS. *(E.)* Kaminski, D. L.; Keltner, R. M.; Willman, V. L. (St. Louis Univ. Sch. Med., Mo.). *Arch. Surg.* 106(4):558-563, 1973.

4534 STERCORAL PERFORATION OF THE SIGMOID COLON. *(E.)* Carter, D. C.; Kirkpatrick, J. R. (Dept. Clin. Surg., Edinburgh Univ., Scotland). *Br. J. Surg.* 60(1):61-63, 1973.

4535 SQUAMOUS-CELL CARCINOMA OF THE ANUS. *(E.)* O'Grady, J. F.; Bacon, H. E.; Koohdary, A. (Temple Univ. Hosp., Philadelphia, Pa.). *Dis. Colon Rectum* 16(1):39-41, 1973.

4536 PAGET'S DISEASE OF THE ANUS SECONDARY TO A MALIGNANT PAPILLARY ADENOMA OF THE RECTUM. *(E.)* Arminski, T. C.; Pollard, R. J. (Grace Hosp., Detroit, Mich.). *Dis. Colon Rectum* 16(1):46-55, 1973.

4537 PAIN FROM DISTENSION OF THE PELVIC COLON BY INFLATING A BALLOON IN THE IRRITABLE COLON SYNDROME. *(E.)* Ritchie, J. (Radcliffe Infirm., Oxford, England). *Gut* 14(2):125-132, 1973.

4538 TREATMENT OF INTESTINAL GAS CYSTS BY OXYGEN BREATHING. *(E.)* Forgacs, P.; Wright, P. H.; Wyatt, A. P. (Brook Gen. Hosp., London, England). *Lancet* 1(7803):579-582, 1973.

4539 ELECTRON MICROSCOPIC DEMONSTRATION OF ADENOVIRUS IN APPENDIX VERMIFORMIS IN A CASE OF ILEOCECAL INTUSSUSCEPTION. *(E.)* Yunis, E. J.; Hashida, Y. (Children's Hosp., Pittsburgh, Pa.). *Pediatrics* 51(3):566-570, 1973.

4540 A SIMPLIFIED ENDORECTAL PULL-THROUGH OPERATION FOR THE TREATMENT OF HIRSCHSPRUNG'S DISEASE. *(E.)* Satomura, K.; Nagamine, S.; Kisaka, Y.; Ueki, S.; Masuda, M.; Hara, K.; Kimura, C. (Sch. Med., Kyoto Univ., Japan). *Surgery* 71(3):345-351, 1972.

4541 IMMUNOLOGIC DIAGNOSIS OF HUMAN DIGESTIVE TRACT CANCER: CARCINOEMBRYONIC ANTIGENS. *(E.)* Kamholz, S. L.; (Montefiore Hosp. Med. Ctr., Bronx, N.Y.). *Am. J. Gastroenterol.* 59(3):233-243, 1973.

4542 CANCER OF THE COLON, RECTUM, AND ANAL CANAL. (PROGNOSIS). *(Por.)* Haddad, J. (Clin. Hosp., Fac. Med., Univ. Sao Paulo, Brazil). *An. Paulistas Med. Cir.* 99(6):399-401, 1972.

4543 RECTOCOLONIC PNEUMATOSIS: VALUE OF COLOSCOPY. *(Fr.)* Pergola, F.; Marteau, J.; Cachin, M. (Cochin Hosp., Paris, France). *Ann. Med. Interne (Paris)* 123(12):1055-1057, 1972.

4544 TOXIC DILATATION OF THE COLON: A SURGICAL DISEASE. *(E.)* Adams, J. T. (Dept. Surg., Univ. Rochester Med. Ctr., N.Y.). *Arch. Surg.* 106(5):678-682, 1973.

4545 VESICO-INTESTINAL FISTULAE. *(E.)* Moisey, C. U.; Williams, J. L. (Roy. Hosp., Sheffield, England). *Br. J. Urol.* 44(6):662-666, 1972.

4546 RENO-COLIC FISTULA DEMONSTRATED BY ANTEGRADE PYELOGRAPHY. *(E.)* Newman, J. H.; Jeans, W. D. (United Bristol Hosp., England). *Br. J. Urol.* 44(6):692-697, 1972.

4547 EVALUATION OF A RADIOIMMUNOASSAY FOR CARCINOEMBRYONIC ANTIGEN OF THE HUMAN DIGESTIVE SYSTEM. *(E.)* LeBel, J. S.; Deodhar, S. D.; Brown, C. H. (Cleveland Clin., Ohio). *Cleve. Clin. Q.* 39(1):25-31, 1972.

4548 INTESTINAL PSEUDO-OBSTRUCTION. *(E.)* Moss, A. A.; Goldberg, H. I. (Univ. California Sch. Med., San Francisco). *Crit. Rev. Radiol. Sci.* 3(3):363-387, 1972.

4549 COLONOFIBERSCOPIC MANAGEMENT OF COLONIC POLYPS. *(E.)* Wolff, W. I.; Shinya, H. (Beth Israel Med. Ctr., New York). *Dis. Colon Rectum* 16(2):87-93, 1973.

4550 PRIMARY ADENOCARCINOMA OF THE VERMIFORM APPENDIX: REPORT OF SEVEN CASES AND REVIEW OF THE LITERATURE. *(E.)* Hopkins, G. B.; Tullis, R. H.; Kristensen, K. A. B. (Scripps Mem. Hosp., La Jolla, Calif.). *Dis. Colon Rectum* 16(2):140-144, 1973.

4551 REVERSIBLE ISCHEMIC COLITIS. *(E.)* Lewis, M. I. (Queen of Angels Hosp., Los Angeles, Calif.). *Dis. Colon Rectum* 16(2):121-126, 1973.

4552 ROENTGENOLOGIC ASPECTS OF CHRONIC PERFORATING CARCINOMA OF THE COLON:

REPORT OF FIVE CASES. *(E.)* Laufer, I.; Joffe, N. (Beth Israel Hosp., Boston, Mass.). *Dis. Colon Rectum* 16(2):127-135, 1973.

4553 COLONOSCOPY WITH THE AID OF A STEEL WIRE TO STIFFEN THE FIBERSCOPE. *(E.)* Gabrielsson, N.; Granqvist, S.; Ohlsen, H. (Karolinska Hosp., Stockholm, Sweden). *Endoscopy* 4:217-218, 1972.

4554 COLONIC COMPLICATIONS AFTER RENAL TRANSPLANTATION. *(E.)* Arvanitakis, C.; Malek, G.; Uehling, D.; Morrissey, J. F. (Univ. Wisconsin Med. Ctr., Madison). *Gastroenterology* 64(4):533-538, 1973.

4555 PSEUDO-CARCINOMATOUS INVASION IN ADENOMATOUS POLYPS OF THE COLON AND RECTUM. *(E.)* Muto, T.; Bussey, H. J. R.; Morson, B. C. (St. Mark's Hosp., London, England). *J. Clin. Pathol.* 26(1):25-31, 1973.

4556 HOSPITAL OUTBREAK OF YERSINIA ENTEROCOLITICA INFECTION. *(E.)* Toivanen, P.; Toivanen, A.; Olkkonen, L.; Aantaa. S. (Dept. Med. Microbiol., Turku Univ., Finland). *Lancet* (7807):801-803, 1973.

4557 DIVERTICULAR DISEASE OF THE COLON: A FREQUENT CAUSE OF MASSIVE RECTAL BLEEDING. *(E.)* Behringer, G. E.; Albright, N. L. (Dept. Surg., Harvard Med. Sch., Boston, Mass.). *Am. J. Surg.* 125(4):419-423, 1973.

4558 OPACIFICATION OF RETROSTERNAL LYMPH NODES FOLLOWING BARIUM PERITONITIS: REPORT OF TWO CASES. *(E.)* Berdon, W. E.; Baker, D. H.; Poznanski, A. (Babies Hosp., Columbia-Presbyterian Med. Ctr., New York). *Radiology* 106(1):171-173, 1973.

4559 BENIGN AND MALIGNANT TUMORS OF THE COLON AND RECTUM. *(E.)* Ferguson, Jr., E. F.; Houston, C. H. (no affil.). *South. Med. J.* 65(10): 1213-1220, 1972.

4560 TOXIC DILATATION OF THE COLON. *(E.)* Soll, E. L.; Ferrante, W. A.; Nice, Jr., C. M. (Ochsner Clin., New Orleans, La.). *South. Med. J.* 65(11):1340-1343, 1972.

4561 TOTAL ABDOMINAL COLECTOMY IN THE SURGICAL MANAGEMENT OF DIVERTICULAR DISEASE OF THE COLON: TWENTY YEARS' EXPERIENCE. *(E.)* Crowson, W. N.; McCaughan, Jr., J. J. (VA Hosp., Memphis, Tenn.). *South. Med. J.* 65(12):1443-1447, 1972.

4562 CONSERVATIVE MANAGEMENT OF THE APPENDIX MASS. *(E.)* Thomas, D. R. (Roy. Sheffield Hosp., England). *Surgery* 73(5):677-680, 1973.

4563 A SIMPLE RECORDING SYSTEM FOR THE DIAGNOSIS OF HIRSCHSPRUNG'S DISEASE AND IDIOPATHIC MEGACOLON. *(E.)* Bar-Maor, J. A. Nissan, S. (Central Emek Hosp., Afula, Israel). *Surg. Gynecol. Obstet.* 136(5):795-796, 1973.

4564 PROFOUND CYSTIC COLITIS: COLITIS CYSTICA PROFUNDA. *(E.)* Agusti Peypoch, J. (Sacred Heart Hosp., Barcelona, Spain). *Am. J. Proctol.* 24(2):137-141, 1973.

4565 EMERGENCY SUBTOTAL COLECTOMY: PREFERRED APPROACH TO MANAGEMENT OF MASSIVELY BLEEDING DIVERTICULAR DISEASE. *(E.)* Drapanas, T.; Pennington, D. G.; Kappelman, M.; Landsey, E. S. (Tulane Univ. Sch. Med., New Orleans, La.). *Ann. Surg.* 177(5):519-526, 1973.

4566 VOLVULUS OF THE SIGMOID COLON. *(E.)* Arnold, G. J.; Nance, F. (Louisiana State Univ. Sch. Med., New Orleans). *Ann. Surg.* 177(5):527-539, 1973.

4567 ENDOMETRIOSIS OF THE BOWEL: ROLE OF RESECTION, SUPERFICIAL EXCISION AND OOPHORECTOMY IN TREATMENT. *(E.)* Gray, L. A. (Univ. Louisville Sch. Med., Ky.). *Ann. Surg.* 177(5):580-587, 1973.

4568 INTERSPHINCTERIC ABSCESS. *(E.)* Parks, A. G.; Thomson, J. P. S. (St. Mark's Hosp., London, England). *Br. Med. J.* 2(5865): 537-539, 1973.

4569 ACUTE ABDOMEN IN RHEUMATOID ARTHRITIS DUE TO NECROTIZING ARTERITIS. *(E.)* Lindsay, M. K.; Tavadia, H. B.; Whyte, A. S.; Lee, P.; Webb, J. (Roy. Infirm., Glasgow, Scotland). *Br. Med. J.* 2(5866):592-593, 1973.

4570 DIVERTICULOSIS AND POLYPS OF THE LARGE INTESTINE: A NECROPSY STUDY OF HAWAII JAPANESE. *(E.)* Stemmermann, G. N.; Yatani, R. (Kuakini Hosp., Honolulu, Hawaii). *Cancer* 31(5):1260-1270, 1973.

4571 DIASTATIC PERFORATIONS OF THE COLON (A CLINICAL STUDY). *(E.)* Asole, F.; Cina, G. (Inst. Special Surg. Pathol. Clin. Propedeutics, Sacred Heart Catholic Univ., Rome, Italy). *Chir. Gastroenterol.* 6(3):250-265, 1972.

4572 LOCAL TREATMENT OF CANCER OF THE RECTUM. *(E.)* Wilson, E. (Sydney Hosp., Australia). *Dis. Colon Rectum* 16(3):194-199, 1973.

4573 REVERSIBLE ISCHEMIC COLITIS: REPORT OF FOUR CASES. *(E.)* Dharia, K. M.; Ngo, N. L.; Marino, Jr., A. W. M.; Mancini, H. W. N.; Shah, I. C. (Brooklyn-Cumberland Med. Ctr., N.Y.). *Dis. Colon Rectum* 16(3):211-215, 1973.

4574 THE FATAL POTENTIAL OF FISTULA-IN-ANO WITH ABSCESS: ANALYSIS OF 11 DEATHS. *(E.)* Marks, G.; Chase, W. V.; Mervine, T. B. (Jefferson Med. Coll., Philadelphia Gen. Hosp., Pa.). *Dis. Colon Rectum* 16(3):224-230, 1973.

4575 RECTAL HYPERPOLARIZATION FOLLOWING INTESTINAL BYPASS FOR OBESITY. *(E.)* Rask-Madsen, J.; Brix Jensen, P.; Lund, J. O. (Glostrup Hosp., Denmark). *Gut* 14(5):390-392, 1973.

4576 INCORPORATION OF ^{35}S SULPHATE INTO ACID MUCOPOLYSACCHARIDES OF COLON IN VITAMIN A DEFICIENT CHILDREN. *(E.)* Mohanram, M.; Reddy, V. (Natl. Inst. Nutr., Indian Council Med. Res., Jamai-Osmania, Hyderabad, India). *Int. J. Vitam. Nutr. Res.* 43(1): 56-60, 1973.

4577 THE IRRITABLE COLON AND RIGHT ILIAC FOSSA PAIN. *(E.)* Lane, D. (Mater Hosp., Brisbane, Australia). *Med. J. Aust.* 1(2):66-67, 1973.

4578 BLEEDING PER-RECTUM IN CHILDREN. *(E.)* Hasan, N.; Akbani, Y.; Zafar, K. (Jinnah Postgrad. Med. Ctr., Karachi, Pakistan). *Pakistan Pediatr. J.* 11(2/3):23-31, 1972.

4579 APPENDICITIS, FIBRE INTAKE AND BOWEL BEHAVIOUR IN ETHNIC GROUPS IN SOUTH AFRICA. *(E.)* Walker, A. R. P.; Walker, B. F.; Richardson, B. D.; Woolford, A. (South African Inst. Med. Res., Johannesburg). *Postgrad. Med. J.* 49(570):243-249, 1973.

4580 ELECTROLYTE TRANSPORT CAPACITY AND ELECTRICAL POTENTIALS OF THE NORMAL AND THE INFLAMED HUMAN RECTUM IN VIVO. *(E.)* Rask-Madsen, J.; Brix Jensen, P. (Glostrup Hosp., Denmark). *Scand. J. Gastroenterol.* 8(2):169-175, 1973.

4581 CARCINOID TUMORS OF THE APPENDIX. *(E.)* Dent, T. L.; Batsakis, J. G.; Lindenauer, S. M. (Univ. Michigan Med. Ctr., Ann Arbor). *Surgery* 73(6):828-832, 1973.

4582 MAJOR COLONIC DISEASES COMPLICATING RENAL TRANSPLANTATION. *(E.)* Misra, M. K.; Pinkus, G. S.; Birtch, A. G.; Wilson, R. E. (Peter Bent Brigham Hosp., Boston, Mass.). *Surgery* 73(6):942-948, 1973.

4583 THE PHYSIOLOGIC STATUS OF THE ANORECTUM AFTER PULL-THROUGH OPERATIONS. *(E.)* Bennett, R. C.; Buls, J.; Kennedy, J. T.; Hughes, E. S. R.; (St. Vincent's Hosp., Melbourne, Australia). *Surg. Gynecol. Obstet.* 136(6):907-913, 1973.

4584 VESICO-ENTERIC FISTULAS. *(E.)* West, Jr., C. F. (Jefferson Med. Coll., Philadelphia, Pa.). *Surg. Clin. N. Am.* 53(3): 565-570, 1973.

4585 THE CLINICAL APPLICATION OF FLEXIBLE FIBEROPTIC COLONOSCOPY. *(E.)* Marks, G.; Moses, M. L. (Jefferson Med. Coll., Philadelphia, Pa.). *Surg. Clin. N. Am.* 53(3):735-756, 1973.

4586 ENTERO-COLITIS FOLLOWING EXCHANGE TRANSFUSION. *(E.)* Beck, J. M.; Dinner, M.; Chappel, J. (Baragwanath Hosp., South Africa). *S. Afr. J. Surg.* 9(1):39-43, 1971.

See also, 4049, 4233, 4237, 4251, 4260, 4266, 4275, 4276, 4279, 4291, 4414, 4433, 4457, 4460, 4466, 4473, 4487, 4587, 4589, 4838, 4843, 4858, 4874, 4884, 4929, 4938.

Ulcerative Colitis

4587 CHRONIC ULCERATIVE COLITIS VERSUS CROHN'S DISEASE OF THE COLON. *(E.)* Huizenga, K. A.; Aas, J.; Spencer, R. J.; Elveback, L. R.; Shorter, R. G. (Mayo Clin., Rochester, Minn.). *Dis. Colon Rectum* 16(2):103-109, 1973.

A reevaluation was made of pathologic diagnoses established for 183 patients with idiopathic inflammatory disease of the colon or its complications. Surgery was performed and diagnoses established for 89 patients from 1956 to 1958 (Group I) and on 94 in 1968 (Group II). Chronic ulcerative colitis had been originally diagnosed in 70 of the 89 patients in Group I, whereas 44 of the 94 patients in group II were originally considered to have Crohn's disease of the colon. Only 47% of those in group I, originally classified as having ulcerative colitis, were classified in the same way on reevaluation, but in group II this percentage increased to 76%. Of the total of 60 patients originally classified as having Crohn's disease, 59 were classified in the same category on reevaluation; the remaining patient was considered unclassifiable. Overall agreement in the diagnosis of either disease increased from 54% in group I to 86% in group II. Toxic megacolon, found in 17 of the 183 patients, occurred in 14 patients with ulcerative colitis and in only 3 with Crohn's disease. Cancer of the colon and rectum was present in 14 of the 71 patients with ulcerative colitis on reevaluation; all but 2 of these patients were between 20 and 30 yr of age at the onset of symptoms of ulcerative colitis. Cancer developed at least 10 yr after onset of symptoms of inflammatory bowel disease. In contrast, only 2 patients with Crohn's disease developed cancer 20 and 30 yr after onset of symptoms of Crohn's disease. These findings demonstrate that the increasing incidence of Crohn's disease of the colon is not due to an actual increase in the proportion of patients with this disease, but to improvement in the differentiation of ulcerative colitis from Crohn's disease.

4588 EPITHELIAL CELL RENEWAL IN CULTURED RECTAL BIOPSIES IN ULCERATIVE COLITIS. *(E.)* Eastwood, G. L.; Trier, J. S. (Boston Univ. Sch. Med., Mass.). *Gastroenterology* 64(3):383-390, 1973.

Epithelial cell proliferation and migration were studied in cultured mucosal biopsies of the rectum from 14 patients (7 men and 7 women, aged 21-75 yr) with ulcerative colitis and 8 normal volunteers. More than twice as many epithelial cells in the proliferative zone of the rectal crypts were labeled in autoradiographs of ulcerative colitis biopsies cultured for 6 hr over ^{3}H-thymidine-containing medium than in normal biopsies. Moreover, after 18 hr of additional culture over isotope-free medium, many more labeled cells had migrated to the upper crypts and the absorptive surface in the ulcerative colitis biopsies than in the normal biopsies. Electron microscopy of the surface epithelium of uncultured and cultured biopsies showed that the cytological abnormalities seen in freshly fixed ulcerative colitis biopsies persisted after 24 hr of culture. These studies indicate that epithelial cell proliferation is increased and migration is accelerated in the rectal mucosa in patients with ulcerative colitis.

4589 MOBILIZATION OF TISSUE KALLIKREIN IN INFLAMMATORY DISEASE OF THE COLON. *(E.)* Zeitlin, I. J.; Smith, A. N. (Western Gen. Hosp., Glasgow, Scotland). *Gut* 14(2):133-138, 1973.

Colonic tissue was taken from 10 patients with active ulcerative colitis who underwent proctocolectomy and 3 patients with uncomplicated diverticular disease but with severe symptoms who underwent partial left hemicolectomy. Levels of kininogen, kallikrein, and kallikrein precursor were measured in blood-free tissue samples. In normal colon tissue a kininogen occurred in the muscle and none was detected in the mucosa. Kallikrein and its precursor were found in mucosa but not muscle. In acutely inflamed tissue from ulcerative colitis patients relatively high levels of active kallikrein were detected in underlying colonic muscle. There was little change in the level of kallikrein in inflamed mucosa or of kininogen in the muscle of these patients. No kallikrein was found in colonic muscle from patients with diverticular disease and the mucosal kallikrein level in these patients was unchanged. In the severely inflammed mucosa of ulcerative colitis, abnormal release of permeability-increasing factors (5-hydroxytryptamine, histamine) or excessive activation of mucosal kinin formation could permit enzyme protein to pass through cell membranes adjacent to the inflammation. The release of kinins within the diseased colonic muscle would account for shortening of the colon and inhibition of motility seen in ulcerative colitis.

4590 NYCTOHEMERAL GROWTH HORMONE LEVELS IN CHILDREN WITH GROWTH RETARDATION AND INFLAMMATORY BOWEL DISEASE. *(E.)* Gotlin, R. W.; Dubois, R. S. (Univ. Colorado Med. Ctr., Denver). *Gut* 14(3):191-195, 1973.

To determine whether retarded growth in children with inflammatory bowel disease is caused by a growth hormone deficiency, nocturnal and diurnal blood levels of growth hormone, insulin, and glucose were measured in 6 children, aged 12-15 yr, with inflammatory bowel disease and severe growth retardation and in 30 normal matched controls. The patients included 2 girls and 1 boy with regional enteritis and 2 boys and 1 girl with chronic ulcerative colitis. All 6 children had the normal sleep-related increase in blood growth hormone levels. In 1 patient the range and mean growth hormone levels were slightly, but not significantly elevated. Normal growth hormone increases occurred in 5 of the 6 in response to arginine infusion. These findings are not compatible with a growth hormone deficiency. Glucose levels were normal and varied appropriately with meals in all 6 children. One patient had sporadic hyperinsulinemia in relation to meals and nocturnal insulin levels were above normal in 2 of the 6 patients. This suggests that these 3 patients may have developed insulin resistance which may contribute to a blunted response of growth hormone to insulin-induced hypoglycemia. Although the onset of puberty was delayed in 5 of these 6 patients, no evidence of secondary thyroid, gonadal, or adrenal insufficiency was observed. The slightly increased blood growth hormone levels found in 1 patient suggests that the blunted response of growth hormone to both arginine- and insulin-induced hypoglycemia may result from continuous secretion and reduced pituitary storage of growth hormone.

4591 ULCERATIVE COLITIS IN CHILDREN: TREATMENT, COURSE, AND PROGNOSIS. *(E.)* Binder, V.; Bonnevie, O.; Gertz, T. C.; Krasilnikoff, P. A.; Vestermark, S.; Riis, P. (Gentofte Univ. Hosp., Hellerup, Denmark). *Scand. J. Gastroenterol.* 8(2): 161-167, 1973.

In 62 of 446 patients (14%) with ulcerative colitis, the onset of the disease occurred before the age of 16 yr. Of these 62 patients, 44 were studied as children, while 18 were admitted as adults. Half of the cases had their onset during puberty, 13-15 yr of age, while the rest were evenly distributed throughout childhood. The activity of the disease was significantly higher than for adult patients, with 90% of the 44 cases judged moderate or very active. In contrast to the high cumulative rates for colectomy (32.7% after 5 yr and 46.2% after 8 yr), rates for death were low (3.1% after 5 yr and 3.1% after 8 yr) and the rate for cancer was zero. Extracolonic manifestations of ulcerative colitis were found in 23 of the 62 patients, and most frequently involved the joints (16 cases); there was 1 case of liver involvement. Surgery was performed in 13 children during this study and the primary procedure was colectomy with preserved rectum and ileostomy (11 cases). Colectomy with primary ileorectal anastomosis and ileostomy without colectomy were performed in 1 case each. Of the 62 cases, 44 were breast-fed in infancy; 7 of these 44 had demonstrated an intolerance to cow's milk. Many of these children (23) were in the high intelligence group. Psychopathologic signs occurred in less than 10% and family conflicts in a little more than 10% of the patients.

4592 ULCERATIVE COLITIS AND CARCINOMA OF THE PROXIMAL BILE DUCTS. *(E.)* Ross, A. P.; Braasch, J. W. (Lahey Clin. Fdn., Boston, Mass.). *Gut* 14(2):94-97, 1973.

4593 LONG-TERM IMMUNOSUPPRESSIVE THERAPY OF ULCERATIVE COLITIS: CONTINUATION OF A PERSONAL SERIES. *(E.)* Korelitz, B. I.; Glass, J. L.; Wisch, N. (Mt. Sinai Hosp., New York, N.Y.). *Am. J. Dig. Dis.* 18(4):317-322, 1973.

4594 A FAMILY STUDY OF ULCERATIVE COLITIS WITH PARTICULAR REFERENCE TO ANKYLOSING SPONDYLITIS AND SACROILIITIS. *(E.)* Macrae, I.; Wright, V. (Gen. Infirm., Leeds, England). *Ann. Rheum. Dis.* 32(1):16-20, 1973.

4595 A PLACE FOR COLOSTOMY IN THE TREATMENT OF ULCERATIVE COLITIS. *(E.)* Wilson, E. (Sydney Hosp., Australia). *Dis. Colon Rectum* 16(2):98-101, 1973.

4596 ADJUNCTIVE USE OF A STEROID RECTAL FOAM IN THE TREATMENT OF ULCERATIVE COLITIS. *(E.)* Scherl, N. D.; Scherl, B. A. (Englewood Hosp., N.J.). *Dis. Colon Rectum* 16(2):149-151, 1973.

4597 OUTPATIENT THERAPY OF ULCERATIVE COLITIS. *(Ger.)* Reitzig, P.; Lisewski, G. (1st Med. Clin., Humboldt Univ., Berlin, Germany). *Dtsch. Gesundheitsw.* 27(36):1717-1719, 1972.

4598 LONG-TERM PROGNOSIS OF CHILDREN WITH ULCERATIVE COLITIS. *(E.)* Goel, K. M.; Shanks, R. A. (Roy. Hosp. Sick Children, Glasgow, Scotland). *Arch. Dis. Child.* 48(5):337-342, 1973.

4599 EVALUATION OF PATIENTS WITH ILEOSTOMIES. *(Ger.)* Halter, F. (Inselspital, Bern, Switzerland). *Schweiz. Med. Wochenschr.* 103(5): 168-171, 1973.

See also, 4244, 4261, 4512, 4523, 4530.

4600 CANCER OF THE PANCREAS: AVAILABLE EPIDEMIOLOGIC INFORMATION AND ITS IMPLICATIONS. *(E.)* Levin, D. L.; Connelly, R. R. (Natl. Cancer Inst., Natl. Inst. Health, Bethesda, Md.). *Cancer* 31(5):1231-1236, 1973.

Cancer of the pancreas is the 4th leading cause of death among all sites of cancer in the U.S. Diagnostic accuracy is difficult to assess because, due to the very nature of the disease, cancer of the pancreas has a low percentage of histologically proven cases compared with other cancer sites. Mortality data on cancer of the pancreas reveals mortality/incidence ratios of 95% for whites and 87% for non-whites. Mortality rates are higher for men than for women in several countries, including the U.S., where both white and non-white men at all ages have a higher mortality than women. No clear patterns were discernable from the data about the influence of environmental or industrial exposure, quality of medical care, selective susceptibility between whites and nonwhites, or geographic distribution. Pancreatic cancer has a pattern of occurrence different from lung cancer, suggesting that either smoking plays a small role in the etiology of the disease or that lung cancer and other diseases related to smoking cause death before the effect of smoking on the pancreas becomes evident. Of the sites examined, the trend in the age-specific sex ratio for cancer of the pancreas is closer to that of diabetes than it is to other cancers of the gastrointestinal tract or to those of sites associated with tobacco or alcohol usage. This lends support to the existence of an association between diabetes and cancer of the pancreas.

4601 PANCREATIC CARCINOMA IN CHILDREN IN JAPAN. *(E.)* Tsukimoto, I.; Watanabe, K.; Lin, J. B.; Nakajima, T. (Toho Univ. Sch. Med., Tokyo, Japan). *Cancer* 31(5):1203-1207, 1973.

A case of pancreatic carcinoma is reported in a 4-yr-old Japanese girl. On hospitalization increases were found in serum bilirubin, SGOT, SGPT, alkaline phosphatase, and the erythrocyte sedimentation rate. At laparotomy a mass measuring 10 x 8 cm was observed in the epigastrium to the left of the hypochondrium below the liver; it adhered to the surrounding viscera. The mesenteric lymph nodes were slightly enlarged, and a scintiscan of the liver revealed a focus of decreased uptake in the right lobe. Histological examination of a biopsy showed the tumor was composed of undifferentiated cells which were suggestive of a metastatic neuroblastoma. Within 10 days the size of the tumor regressed markedly when cyclophosphamide and vincristine were infused i.v. once a week on alternate weeks. However, the patient became comatose, jaundice increased, and severe uncontrollable bleeding developed. Autopsy showed a mass (6 x 5 x 5 cm) on the head of the pancreas which had completely destroyed the pancreatic duct and metastasized to the mesenteric lymph nodes and liver, where it invaded the main branches of the portal vein. Histological examination showed the tumor was an adenocarcinoma. On the basis of this case and 11 others reported in the Japanese literature, it is recommended that pancreatic carcinomas in children be treated by complete surgical removal. Further consideration should be given to combined chemotherapy.

4602 ISOLATION AND CHARACTERIZATION OF A CILIARY DYSKINETIC FACTOR FROM CYSTIC FIBROSIS HETEROZYGOUS SERUM. *(E.)* Schmoyer, I. R.; Brooks, S. P.; Fischer, J. F. (Dept. Biol., State Univ. New York, Fredonia). *Life Sci. [II]* 11(2):1037-1044, 1972.

Ciliary dyskinesis was observed on gills of the common oyster *Crassostrea virginica* in the presence of unfractionated cystic fibrosis heterozygous serum and in preparations obtained from the fractionation of both heterozygous and normal sera. A cationic factor responsible for the dyskinesis was fractionated by ion exchange chromatography followed by isoelectric focusing. Normal sera fractions produced dyskinesis within limited gill areas and had a less pronounced effect than heterozygous serum fractions. More dramatic dyskinesis was always observed with isoelectrically focused fractions than with whole sera. The purified preparation has an isoionic point of 8.5 and migrates as a single symmetrical band during acrylamide gel electrophoresis. The factor was further characterized by double immunodiffusion as an immunoglobulin. An antibody produced in rabbit to the isoelectrically focused heterozygous product formed precipitin bands with both normal and heterozygous serum. This, plus the presence of an inhibitory fraction in normal serum suggests a quantitative, rather than a qualitative, difference in the two kinds of sera.

4603 RELATIONS BETWEEN PANCREATIC ENZYME OUTPUTS AND MALABSORPTION IN SEVERE PANCREATIC INSUFFICIENCY. *(E.)* DiMagno, E. P.; Go, V. L. W.; Summerskill, W. H. J. (Mayo Clin., Rochester, Minn.). *N. Engl. J. Med.* 288(16):813-815, 1973.

The relations of steatorrhea and creatorrhea to lipase and trypsin outputs were studied in 17 patients with chronic pancreatitis (13 men, 4 women; 18-71 yr old) and 33 healthy subjects to investigate the functioning reserve capacity of the exocrine pancreas. A standard diet was given, and stools were collected for 48 hr. Total enzyme outputs in response to duodenal perfusion of essential amino acids (78 mM) and cholecystokinin-pancreozymin (0.25 U/kg/min i.v.) were compared in patients and in healthy subjects. Steatorrhea was not observed until the lipase output was 10% or less of normal; similarly, creatorrhea occurred only when trypsin outputs were less than 10% of normal. Thus, 90% of the gland must be functionally destroyed or obstructed before steatorrhea or creatorrhea occurs. This demonstrates the existence of a large reserve capacity for enzyme secretion by the exocrine pancreas and explains the often late development of steatorrhea and creatorrhea in chronic pancreatitis.

4604 RADIOGRAPHIC ABNORMALITIES OF THE DUODENUM AND SMALL BOWEL IN CYSTIC FIBROSIS OF THE PANCREAS (MUCOVISCIDOSIS). *(E.)* Taussig, L. M.; Saldino, R. M.; di Sant'Agnese, P. A. (Pediatr. Metabolism Br., Natl. Inst. Health, Bethesda, Md.). *Radiology* 106(2):369-376, 1973.

Barium studies of the duodenum in 33 patients (20 male, 13 female, aged 4-42 yr) with cycstic fibrosis of the pancreas revealed abnormalities in 84% of the subjects. These consisted of markedly thickened and coarse folds, nodular filling defects, mucosal smudging, dilatation, and redundancy. These changes were usually confined to the first and second portions of the duodenum, but the thickened fold pattern occasionally extended into the proximal jejunum. The etiology of these changes is obscure, but contractions of the duodenal muscle layer secondary to irritation from unbuffered gastric acid are a likely explanation. It is important to recognize these abnormalities so that faulty diagnoses, especially of peptic ulcer, are not made; other diagnostic procedures may then be avoided. Changes in the rest of the small intestine were uncommon and were not similar to the "deficiency" pattern described in the past for cystic fibrosis.

4605 THE ADVISABILITY OF PRELIMINARY LIGATION OF THE EFFERENT VESSELS OF THE PANCREAS IN DUODENO-CEPHALOPANCREATECTOMY FOR CANCER. *(E.)* Benedetti Valentini, S.; Benedetti Valentini, G. (Arcisp. San Giacomo Augusta, Rome, Italy). *Chir. Gastroenterol.* 6(3):309-314, 1973.

4606 HETEROTOPIC PANCREATIC TISSUE AT THE ODDI SPHINCTERIAN SYSTEM: ITS RELATIONSHIP TO BENIGN STENOSIS OF THE DISTAL END OF THE COMMON BILE DUCT. *(E.)* Pera, C.; Fernandez-Cruz, L. (Fac. Med., Univ. Barcelona, Spain). *Chir. Gastroenterol.* 6(4):357-365, 1972.

4607 CALCIFIED LIVER METASTASES FROM AN ISLET CELL CARCINOMA. *(Ger.)* Kutzner, J.; Wagner, R. (Inst. Clin. Radiol., Univ. Mainz, Germany). *Fortschr. Geb. Roentgenstr. Nuklearmed.* 118(3):255-258, 1973.

4608 WHY IS PANCREATIC CANCER INCIDENCE UP; STOMACH CANCER DOWN? *(E.)* Krain, L. S. (UCLA Med. Center, Los Angeles, Cal.). *Geriatrics* 28(4):140-145, 1973.

4609 LYMPHANGIOMA OF THE HEAD OF THE PANCREAS. *(Ger.)* Maurer, W.; Locher, G. W. (Munic. Hosp., Solothurn, Switzerland). *Helv. Chir. Acta* 39(5/6):801-807, 1972.

4610 PANCREATIC DAMAGE IN EXPERIMENTAL MANGANESE INTOXICATION. *(E.)* Chandra, S. V.; Mustafa, S. J. (Ind. Technol. Res. Center, Lucknow, India). *Indian J. Ind. Med.* 18(3):135-138, 1972.

4611 EXOCRINE PANCREATIC DISEASE IN CHILDHOOD. *(E.)* Walker-Smith, J. A. (Roy. Alexandra Hosp. Child., Sydney, Australia). *Med. J. Aust.* 1(14):704-708, 1973.

4612 MALABSORPTION OF CRYSTALLINE VITAMIN B_{12} IN CYSTIC FIBROSIS. *(E.)* Deren. J. J.; Arora, B.; Toskes, P. P.; Hansell, J.; Sibinga, M. S. (Univ. Pennsylvania Sch. Med., Philadelphia). *N. Engl. J. Med.* 288(18):949-950, 1973.

4613 PANCREATIC TRAUMA: MANAGEMENT AND PRESENTATION OF A NEW TECHNIQUE. *(E.)* Owens, M. P.; Wolfman, Jr., E. F. (Univ. California Sch. Med., Davis). *Surgery* 73(6):881-886, 1973.

4614 A NEWLY RECOGNIZED CASE OF 9S MACROAMYLASEMIA ACCOMPANIED BY DIABETES MELLITUS AND LIVER INJURY. *(E.)* Niwayama, M.; Ito, G.; Kinoshita, Y.; Koami, E.; Yakata, M. (Niigata Univ. Sch. Med., Japan). *Acta Med. Biol.* 20(1):33-42, 1972.

4615 MAGNESIUM AND THE PANCREAS. *(E.)* Hersh, T.; Siddiqui, D. A. (Rhode Island Hosp., Providence). *Am. J. Clin. Nutr.* 26(3):362-366, 1973.

4616 SURGICAL TREATMENT OF PANCREATIC PSEUDOCYSTS. *(E.)* Asp, K.; Salmenkivi, K. (Univ. Central Hosp., Helsinki, Finland). *Ann. Chir. Gynaecol. Fenn.* 61(5):291-293, 1972.

4617 PANCREATICODUODENAL RESECTION: TWENTY YEARS' EXPERIENCE. *(E.)* Aston, S. J.; Longmire, Jr., W. P. (UCLA Sch. Med., Los Angeles, Calif.). *Arch. Surg.* 106(6):813-817, 1973.

4618 EFFECT OF SALIVA AND SERUM FROM PATIENTS WITH CYSTIC FIBROSIS ON INTESTINAL UPTAKE OF AMINO ACIDS IN RAT. *(E.)* Morin, C. L.; Desjeux, J. F.; Authier, L. (Hop. Sainte-Justine, Montreal, Canada). *Biomedicine* 19(4):133-137, 1973.

4619 HAEMOLYTIC ANAEMIA ASSOCIATED WITH CARCINOMA OF THE PANCREAS. *(E.)* Pengelly, C. D. R.; Qureshi, Z. A. (Gen. Hosp., Altrincham, England). *Br. J. Clin. Pract.* 27(4):141-144, 1973.

4620 CARCINOMA OF PANCREAS: PALLIATIVE RADIOTHERAPY. *(E.)* Green, N.; Beron, E.; Melbye, R. W.; George, III, F. W. (Hosp. Good Samaritan, Los Angeles, Calif.). *Am. J. Roentgenol. Radium Ther. Nucl. Med.* 117(3):620-622, 1973.

4621 PANCREATIC INJURIES: METHODS OF MANAGEMENT. *(E.)* Steele, M.; Sheldon, G. F.; Blaisdell, F. W. (Univ. California Sch. Med., San Francisco Gen. Hosp.). *Arch. Surg.* 106(4):544-550, 1973.

4622 PSEUDOCYST OF THE PANCREAS. *(E.)* Simpson, A.; Srivastava, V. K. (West Bromwich District Gen. Hosp., Staffordshire, England). *Br. J. Surg.* 60(1):45-49, 1973.

4623 PANCREATIC SCANNING IN THE ASSESSMENT OF PANCREATIC FUNCTION: EXPERIENCES WITH 14 CASES OF PANCREATIC STEATORRHOEA. *(E.)* Roberts, H. J. V.; Andrews, J. T.; Steven, L. W. (Repatriation Gen. Hosp., Melbourne, Australia). *Med. J. Aust.* 2(24):1344-1348, 1972.

4624 PSEUDOCYST OF THE PANCREAS SECONDARY TO GASTRIC DUPLICATION. *(E.)* Cloutier, R. (no affil.). *J. Pediatr. Surg.* 8(1):67, 1973.

4625 PANCREATIC TRANSPLANTATION. *(E.)* Hermon-Taylor, J. (London Hosp., England). *J. R. Coll. Surg. Edinb.* 17(3):167-172, 1972.

4626 SECRETING TUMOURS OF THE PANCREAS. *(E.)* Sircus, W. (Western Gen. Hosp., Edinburgh, Scotland). *J. R. Coll. Surg. Edinb.* 17(3):172-179, 1972.

4627 PANCREAS TRANSPLANTATION AND THE ARTIFICIAL PANCREAS: STATUS OF CURRENT EXPERIMENTAL APPROACHES. *(E.)* Felts, P. W. (Vanderbilt Univ. Sch. Med., Nashville, Tenn.). *South. Med. J.* 66(1):66-73, 1973.

See also, 4231, 4234, 4252, 4254, 4259, 4282, 4293, 4426, 4517, 4638, 4658.

PANCREAS

Pancreatitis

4628 OPERATIVE TREATMENT OF CHRONIC RECURRENT PANCREATITIS. *(E.)* Cahow, C. E.; Hayes, M. A. (Yale Univ. Sch. Med., New Haven, Conn.). *Am. J. Surg.* 125(4):390-398, 1973.

Recurrent chronic pancreatitis secondary to alcoholism is described in 6 patients. One patient had concurrent mild diabetes. In 5 cases the patients had severe pain with a good medical regimen and abstinence from alcohol. All were treated with ablation of the celiac ganglia, vagotomy, and either a gastric drainage procedure (4 patients) or antrectomy and gastrojejunostomy (2 patients). In 5 cases, relief of abdominal pain was achieved during a follow-up period of 1 month to 2 yr. In 2 cases, detailed studies of serum and urine amylase and serum lipase values were carried out preoperatively, while the patients were on a good medical regimen, and again postoperatively. These indicated elevated levels of both enzymes preoperatively. In all cases postoperative serum amylase and lipase values returned to normal and remained there after patients returned to high protein, high fat diets. There were no deaths and only 1 serious complication, a left subphrenic abscess which responded to operative drainage.

4629 ACUTE PANCREATITIS WITH HYPERLIPEMIA: THE INCIDENCE OF LIPID ABNORMALITIES IN ACUTE PANCREATITIS. *(E.)* Cameron, J. L.; Capuzzi, D. M.; Zuidema, G. D.; Margolis, S. (Johns Hopkins Med. Inst., Baltimore, Md.). *Ann. Surg.* 177(4):483-489, 1973.

In order to document the incidence of lipid abnormalities, lipid metabolism was studied in 48 consecutive patients with acute pancreatitis. Results were compared to 34 patients with abdominal pain, but without acute pancreatitis, who were used as controls. Ten patients (21%) with acute pancreatitis had lactescent serum; their triglyceride levels ranged from 493 to 7520 mg/100 ml. An additional 8 patients (17%) with acute pancreatitis had elevated triglyceride levels ranging from 186 to 551 mg/100 ml, but did not have lactescent serum. None of the controls had lactescent serum, but 9% had triglyceride elevations. Decreased post-heparin lipolytic activity, and post-heparin lipolytic activity inhibition were detected in both groups of patients, but neither were consistently related to triglyceride levels. Lipoprotein electrophoresis demonstrated that all patients with lactescent serum and acute pancreatitis had either a type I or type V pattern. Some evidence suggests that lipid abnormalities can be secondary to inflammatory pancreatic disease. However, there are instances in which lipids play an intermediary role in the pathogenesis of acute pancreatitis.

4630 HYPOTENSION AND RELEASE OF KININ-FORMING ENZYME INTO ASCITIC FLUID EXUDATE DURING EXPERIMENTAL PANCREATITIS IN DOGS.

(E.) Satake, K.; Rozmanith, J. S.; Appert, H. E.; Carballo, J.; Howard, J. M. (Hahnemann Med. Coll., Philadelphia, Pa.). *Ann. Surg.* 177(4):497-502, 1973.

The hypotensive effects and kinin-forming enzyme content of pancreatic juice were compared with those of ascitic fluid exudate obtained from bile-induced pancreatitis in dogs. Pancreatic juice was infused i.v. (total of 50 ml) into each of 12 dogs. Normal pancreatic juice in healthy dogs caused only transient hypotension and an increased flow in the abdominal aorta and portal vein. Neither trypsin nor bradykinin was detected in normal pancreatic juice, but a fairly large amount of kinin-forming enzyme was present. The hypotensive effects of pure pancreatic juice, collected from Thomas fistulae dogs, was slightly greater than that of an equal amount of ascitic exudate. Ascitic fluid, however, might contribute significantly to hypotension during acute pancreatitis since a large amount of fluid accumulated within the peritoneal cavity. This effect might be additive to the hypotension caused by the leakage of pancreatic juice directly into the circulation. The pancreatic enzyme levels in ascitic fluid were very high, but active trypsin was detected in less than half the experiments. The kinin-forming activity of the ascitic exudate was usually greater than that of pancreatic juice. This implies that the injured pancreas may release an additional amount of kinin-forming enzyme over and above that found in normal pancreatic juice. Another possibility is that the exudate causes a release of additional enzymes after its escape into the peritoneal cavity.

4631 ACUTE PANCREATITIS AND HYPERAMYLASEMIA IN RENAL HOMOGRAFT RECIPIENTS.

(E.) Penn, I.; Durst, A. L.; Machado, M.; Halgrimson, C. G.; Booth, Jr., A. S.; Putman, C. W.; Groth, C. G.; Starzl, T. E. (Univ. Colorado Sch. Med., Denver). *Arch. Surg.* 105(2):167-172, 1972.

Of 301 renal homograft recipients, 17 (5.6%) developed acute pancreatitis at some time after transplantation. The patients ranged in age from 3-57 yr; 207 were male, 94 female. Donors were related to recipients in 230 cases. Of these patients, 11 died. In each instance, pancreatitis was a major factor in a complex chain of lethal events to which immunosuppression invariably contributed. An additional 43 patients (14.3%) developed asymptomatic hyperamylasemia after transplantation and some of these recipients undoubtedly also had pancreatitis. Of these 43, 12 eventually died. Postmortem examination of 10 showed either a normal pancreas or insignificant histological changes. The factors causing pancreatitis in the renal transplantation patient include uremia, hyperparathyroidism, pancreatic injury by drugs, infections resulting from chronic immunosuppression, gallstones, and operative trauma to the pancreas. In cases of preexisting pancreatitis, (5 patients in this study), transplantation is not necessarily precluded, but efforts should be made to find a specific cause of the pancreatitis and to take corrective measures, such as biliary tract surgery or parathyroidectomy if indicated, before transplantation.

4632 HEMODYNAMIC AND METABOLIC EFFECTS OF VASOPRESSIN IN ACUTE HEMORRHAGIC PANCREATITIS.

(E.) Pissiotis, C. A.; Van Meter, S. W.; Condon, R. E. (Univ. Iowa Coll. Med., Iowa City). *Eur. Surg. Res.* 5(1):64-72, 1973.

Acute hemorrhagic pancreatitis was induced in adult mongrel dogs by injecting a mixture of 6 ml blood, 40,000 U crystalline trypsin, and 4 ml bile into the main pancreatic duct under a pressure of more than 140 mm Hg. Cardiac output, aortic blood pressure, pancreatic blood flow, portal pressure, and splanchnic oxygen extractions were measured in normal dogs and in vasopressin-treated and untreated dogs with pancreatitis. Vasopressin-treated animals received 0.012 U/kg/min. Cardiac output decreased 30% after 30 min and 50% after 120 min in dogs with pancreatitis. Cardiac output was higher in dogs treated with vasopressin. Pancreatic blood flow decreased 58% in animals with pancreatitis; less of a decrease occurred in vasopressin-treated dogs. Portal venous pressure increased immediately after induction of pancreatitis but was lower in vasopressin-treated dogs. Serum amylase increased in both treated and untreated pancreatitis. A difference in the arterial-pancreatic venous oxygen gradient was noted between untreated and treated pancreatitis, whereas no difference was noted between these groups in the arterial-portal venous oxygen gradient. This may mean that the inflamed pancreas in treated animals extracts more oxygen supplied to it through a higher perfusion pressure and flow. The vasopressin effect in pancreatitis is mainly dependent on systemic responses to the drug. It is concluded that vasopressin reduced portal pressure and maintains pancreatic perfusion and oxygen extraction in acute hemorrhagic pancreatitis. This effect appears to be due to peripheral vasoconstriction, reduction of intrahepatic vascular resistance, and preservation of the cardiac output.

4633 INFECTIOUS COMPLICATIONS OF ACUTE PANCREATITIS.

(E.) Kodesch, R.; Dupont, H. L. (Univ. Maryland Sch. Med., Baltimore). *Surg. Gynecol. Obstet.* 136(5):763-768, 1973.

The course of 100 episodes of acute pancreatitis in 92 patients was reviewed for a 47-month period. Generally, pancreatitis occurred in males 30 to 59 yr old; 69 were nonwhite. Common laboratory and clinical findings included leukocytosis, hyperbilirubinemia, azotemia, hypercalcemia, hypocalcemia, hypercholesterolemia, ileus, pleural effusion, and hiatal hernia. Alcohol was the predominant etiologic factor (67 cases). Other factors included biliary tract disease (5 patients), biliary tract disease with alcoholism (2), trauma (5), and poor surgical procedures (6). In 15 cases no etiological factor could be determined. Bacterial infection was present in 29%. Of the 67 alcoholic pancreatitis patients, 17 experienced an infectious complication. Infection was most common when pancreatitis resulted from trauma or surgical procedures. In 11 instances, the patient presented with both pancreatitis and an infection while, in 18 episodes, an infection developed after the onset of pancreatitis. Of 5 deaths, 4 appeared directly related to an infection. The most common form of bacterial complication was urinary tract infection. There was a wide variation in bacterial causes of the infections, with *Escherichia coli* or multiple species most commonly isolated. Prophylactic antibiotics offered no discernible protection against the development of an infectious complication.

4634 DRAINAGE THROUGH THE STOMACH OF A PANCREATIC ABSCESS WITH NECROSIS. *(Gr.)* Tountas, C.; Michalopoulos, S.; Pissidis, A.; Panousis, P. (no affil.) *Acta Chir. Hellenica* 44(2):268-274, 1972.

4635 EFFECT OF ALCOHOL ON DUODENAL-PANCREATIC REFLUX. *(E.)* Rosato, E. F.; Butler, C. J.; Grossman, R.; Mullen, J. L.; Skerrett, P. V.; Rosato, F. E. (Univ. Pennsylvania Sch. Med., Philadelphia). *Am. J. Surg.* 125(2):228-230, 1973.

4636 OBSERVATIONS ON ACUTE PANCREATITIS: A RETROSPECTIVE CLINICAL STUDY. *(E.)* Gillespie, W. J. (Roy. Infirm., Edinburgh, Scotland). *Br. J. Surg.* 60(1):63-65, 1973.

4637 RUPTURE OF A PSEUDOCYST OF THE PANCREAS WITH MASSIVE HEMOPERITONEUM. *(Fr.)* Deschreyer, M.; Dony, A. (Inst. Med.-Chir., Schaerbeek-Brussels, Belgium). *Acta Gastroenterol. Belg.* 35(2):556-560, 1972.

4638 ALCOHOL, THE PANCREAS, PANCREATIC INFLAMMATION, AND PANCREATIC INSUFFICIENCY. *(E.)* Baum, R.; Iber, F. L. (Tufts Univ. Sch. Med., Medford, Mass.). *Am. J. Clin. Nutr.* 26(3):347-351, 1973.

4639 CALCIUM METABOLISM IN PANCREATIC DISEASE. *(E.)* D'Souza, A.; Floch, M. H. (Norwalk Hosp., Conn.). *Am. J. Clin. Nutr.* 26(3):367-373, 1973.

4640 NUTRITIONAL ASPECTS OF CHRONIC PANCREATITIS. *(E.)* Taubin, H. L.; Spiro, H. M. (Yale Univ. Sch. Med., New Haven, Conn.). *Am. J. Clin. Nutr.* 26(3):367-373, 1973.

4641 RELATION OF THE MAGNITUDE OF BLOOD ENZYME ELEVATION TO SEVERITY OF EXOCRINE PANCREATIC DISEASE. *(E.)* Gullick, H. D. (VA Hosp., Syracuse, N.Y.). *Am. J. Dig. Dis.* 18(5):375-383, 1973.

4642 HISTAMINE RELEASE DURING EXPERIMENTAL ACUTE HAEMORRHAGIC PANCREATITIS IN DOGS. *(E.)* Amundsen, E. (Rikshosp., Oslo, Norway). *Ann. Chir. Gynaecol. Fenn.* 61(5): 251-253, 1972.

4643 DIAGNOSTIC ASPECTS IN CHRONIC PANCREATITIS. *(E.)* Salmi, H. J. (Univ. Cent. Hosp., Helsinki, Finland). *Ann. Chir. Gynaecol. Fenn.* 61(5):260-263, 1972.

4644 ASPECTS OF LABORATORY TESTS FOR PANCREATITIS. *(E.)* Tenhunen, R. (Dept. Clin. Chem., Univ. Helsinki, Finland). *Ann. Chir. Gynaecol. Fenn.* 61(5):264-268, 1972.

4645 THE AETIOLOGY AND TREATMENT OF ACUTE PANCREATITIS FOLLOWING BILIARY-TRACT OPERATIONS. *(E.)* Keighley, M. R. B.; Graham, N. G. (Huddersfield Roy. Infirm., England). *Br. J. Surg.* 60(2):149-152, 1973.

4646 THE USE OF PROTEASE INHIBITORS DURING HAEMORRHAGIC PANCREATITIS: EXPERIMENTAL FINDINGS AND CLINICAL APPLICATIONS. *(E.)* Amundsen, E. (Rikshosp., Oslo, Norway). *Ann. Chir. Gynaecol. Fenn.* 61(5):284-287, 1972.

4647 SURGICAL TREATMENT OF CHRONIC PANCREATITIS. *(E.)* Cederberg, A. (Univ. Cent. Hosp., Helsinki, Finland). *Ann. Chir. Gynaecol. Fenn.* 61(5):288-290, 1972.

4648 ACUTE HEMORRHAGE CAUSED BY RUPTURE OF A PANCREATICODUODENAL ARTERY WITH CONTACT FROM A PANCREATIC PSEUDOCYST. *(Fr.)* Gouin, B.; Blanc, D.; Darviche, M.; Hardouin, J. P.; Debray, C. (Bichat Hosp., Paris, France). *Ann. Med. Interne (Paris)* 123(4):369-373, 1972.

4649 SEVERE JAUNDICE AND ACUTE HEMORRHAGIC PANCREATITIS. *(Fr.)* Launois, J. P.; Cachin, M.; Levy, C. (Cochin Hosp., Paris, France). *Ann. Med. Interne (Paris)* 123(12): 1051-1053, 1972.

4650 COMPARATIVE MORPHOMETRIC STUDY OF THE HUMAN PANCREAS IN ITS NORMAL STATE AND IN PRIMARY CHRONIC CALCIFYING PANCREATITIS. *(E.)* Tasso, F.; Stemmelin, N.;

Sarles, H.; Clop, J. (I.N.S.E.R.M., Marseille, France). *Biomedicine* 18(2):134-144, 1973.

4651 SURGICAL TREATMENT OF HEREDITARY PANCREATITIS: REPORT OF A CASE. *(E.)* Edmondson, H. T.; Holmes, W. C. (Med. Coll. Georgia and VA Hosp., Augusta). *J. Med. Assoc. Ga.* 62(5):137-143, 1973.

4652 THE AETIOLOGY AND TREATMENT OF ACUTE PANCREATITIS. *(E.)* Salmonkivi, K.; Asp, K. (Univ. Cent. Hosp., Helsinki, Finland). *Ann. Chir. Gynaecol. Fenn.* 61(5):281-283, 1972.

4653 PERSISTENT EPIGASTRIC PAIN IN AN ALCOHOLIC WITH CHRONIC PANCREATITIS AND NUMEROUS BACTERIA IN GASTRIC ASPIRATE. *(E.)* Jenkins, L. B.; Pettit, H. S.; Gaede, J. T.; Pratt-Thomas, H. R.; Upshur, J. K. (no affil.). *J. S. C. Med. Assoc.* 69(2):40-45, 1973.

4654 MODIFICATIONS OF LIPOPROTEIN LIPASE IN PANCREATITIS. *(Ger.)* Oehler, G.; Huth, K.; Schmahl, F. W.; Roka, L. (Med. Clin. Polyclin., Justus Liebig Univ., Giessen, Germany). *Klin. Wochenschr.* 51(7):350-351, 1973.

4655 FINE STRUCTURE OF EARLY EXPERIMENTAL ACUTE PANCREATITIS IN DOGS. *(E.)* Bockman, D. E.; Schiller, W. R.; Suriyapa, C.; Mutchler, J. H. W.; Anderson, M. C. (Med. Coll. Ohio, Toledo). *Lab. Invest.* 28(5):584-592, 1972.

4656 METASTATIC FAT NECROSIS AND LYTIC BONE LESIONS IN A PATIENT WITH PAINLESS ACUTE PANCREATITIS. *(E.)* Boswell, S. H.; Baylin, G. J. (Duke Univ. Med. Ctr., Durham, N.C.). *Radiology* 106(1):85-86, 1973.

4657 EXPERIMENTAL PANCREATITIS IN THE DOG. DEMONSTRATION OF TRYPSIN IN ASCITIC FLUID, LYMPH AND PLASMA. *(E.)* Ohlsson, K.; Tegner, H. (Univ. Lund, Malmo Gen. Hosp., Sweden). *Scand. J. Gastroenterol.* 8(2):129-133, 1973
8(2):129-133, 1973.

4658 PANCREATIC ASCITES: RUPTURE OF PANCREATIC DUCT IN PATIENTS WITH CHRONIC PANCREATITIS. *(E.)* Barakat, M.; Goyal, R. K.; Hersh, T. (Baylor Coll. Med., Houston, Tex.). *South. Med. J.* 65(11):1377-1379, 1972.

4659 DIAGNOSIS AND TREATMENT OF CHRONIC PANCREATITIS. *(Fr.)* Ribet, A.; Pascal, J. P. (Regional Hosp. Ctr., Toulouse, France). *Therapeutique* 48(7/8):489-491, 1972.

4660 OPERATIVE THERAPY IN PANCREATITIS AND ITS COMPLICATIONS. *(E.)* Frey, C. F. (Dept. Surg., Univ. Michigan, Ann Arbor). *Univ. Mich. Med. Cent. J.* 38(3):103-110, 1972.

See also, 4231, 4253, 4603, 4615.

LIVER AND BILIARY TRACT

4661 GASTROINTESTINAL AND ABDOMINAL MANIFESTATIONS OF AGNOGENIC MYELOID METAPLASIA. *(E.)* Silverstein, M. N.; Wollaeger, E. E.; Baggenstoss, A. H. (Mayo Clin., Rochester, Minn.). *Arch. Intern. Med.* 131(4):532-537, 1973.

Gastrointestinal and abdominal manifestations of agnogenic myeloid metaplasia were reviewed from the records of 122 patients with this disorder. Abdominal pain of splenic origin occurred in 25% of the patients. Hepatomegaly was present in 92 patients, but excretory function of the liver generally remained good. Liver biopsies showed evidence of extramedullary hematopoiesis in all 13 patients examined. The degree of hepatomegaly was paradoxically greater in comparison to the relatively mild pathologic changes observed in liver biopsies. Portal hypertension with esophageal varices occurred in 9 patients and 1 of these also had ascities. Other abdominal manifestations included postprandial fullness (20), massive gastrointestinal hemorrhage (6), massive ascites (3), duodenal ulcer (2), carcinoma of the colon (1), and chronic pancreatitis (1). Liver biopsies from 3 patients with symptomatic portal hypertension without obstruction of the extrahepatic portal system showed only mild or moderate agnogenic myeloid metaplasia. The findings support the concept that increased portal blood flow is important in the pathogenesis of portal hypertension in patients with agnogenic myeloid metaplasia. A theoretical dual mechanism to explain this concept is suggested: (1) increased blood flow through a massively enlarged spleen and (2) functional intrahepatic obstruction resulting from extramedullary hematopoiesis, triaditis, or periportal fibrosis in the liver.

4662 HEPATIC ARTERY LIGATION AND CYTOTOXIC INFUSION IN TREATMENT OF LIVER METASTASES.

(E.) Gulesserian, H. P.; Lawton, R. L.; Condon, R. E. (Univ. Iowa Coll. Med., Iowa City). *Arch. Surg.* 105(2):280-285, 1972.

Hepatic artery ligation was used to treat 8 patients (7 females and 1 male, aged 45-67 yr) with severe symptoms caused by hepatic metastases. These patients had the following primary tumors: epidermoid carcinoma of the cervix (1); adenocarcinoma of the gallbladder (1); carcinoid of the small bowel (1); adenocarcinoma of the colon (3); cholangiocarcinoma (1); and anaplastic carcinoma of the liver (1). Infusion of the distal hepatic arterial system with fluorouracil (12 mg/kg) was started after SGOT, SGPT, and LDH returned to preoperative levels. Minor deterioration in liver function occurred, which was reversible within 9 days. Serial liver scans showed reduction in size of the deposits and tumor necrosis was demonstrated in 1 patient on liver biopsy. Symptoms improved considerably in all patients, and 7 are still alive and in clinical remission. Significant palliative effects can be achieved by hepatic artery ligation and infusion. Morbidity and mortality are minimal.

4663 DIFFERENTIAL DIAGNOSIS OF PRIMARY MALIGNANT HEPATOMA IN 569 BANTU MINEWORKERS.

(E.) Geddes, E. W.; Falkson, G. (Crown Mines Hosp., Johannesburg, South Africa). *Cancer* 31(5):1216-1221, 1973.

Investigations for possible primary cancer of the liver were made on 569 male Bantu mineworkers with hepatomegaly. This diagnosis was confirmed histologically in 353 cases, and there were another 10 probable, but unconfirmed, cases. In 65% of the patients with histologically confirmed primary malignant hepatomas, there was evidence of advanced cancer or metastases. Chest x-rays revealed pulmonary metastases in 22%, and autopsies, performed on 298 patients, showed pulmonary metastases in 51%. Space-occupying liver lesions, manifested by definite scan defects, occurred on 199 of 338 hepatic scintiscans. Of these 199 patients, 150 had primary malignant hepatoma and 49 had metastatic cancer or other diseases affecting the liver. Primary malignant hepatomas were confirmed in 22 of 87 patients whose scans contained scattered or widespread areas of decreased radioactive uptake; 4 confirmed cases had no scan defects. Liver scans were of no diagnostic value in 118 cases (35.8%). α-Fetoprotein tests were positive in 224 of the 546 patients tested, including 5 of the 10 whose diagnosis could not be histologically confirmed. Three other patients with positive tests died, but no definitive diagnosis could be established, even at autopsy. In addition to the 353 patients with primary malignant hepatomas, 63 had cirrhosis, 44 tuberculosis, 29 liver abscess and amebic hepatitis, 11 viral hepatitis, 15 congestive heart failure, 20 cancers that had metastasized from other sites, and 23 miscellaneous diseases.

4664 HEPATOCELLULAR HYALIN IN CHOLESTASIS AND CIRRHOSIS: ITS DIAGNOSTIC SIGNIFICANCE.

(E.) Gerber, M. A.; Orr, W.; Denk, H.; Schaffner, F.; Popper, H. (Mt. Sinai Hosp., New York, N.Y.). *Gastroenterology* 64(1):89-98, 1973.

Liver tissue was examined from 243 patients with the following disorders: alcoholic hepatitis (14); alcoholic hepatitis with hyaline sclerosis approaching the portal tract (9); alcoholic cirrhosis with alcoholic hepatitis (27); primary biliary cirrhosis, precirrhotic (18) and cirrhotic (12); extrahepatic biliary obstruction (14); biliary atresia (14); acute viral hepatitis (icteric) (14); drug or other chemically induced hepatitis (17); chronic persistent (portal) hepatitis (9); chronic aggressive (periportal) hepatitis (30); cirrhosis with chronic aggressive hepatitis (32); cirrhosis, active nonalcoholic (selected from 540 cases) (8); fatal Wilson's disease (4); and Indian childhood cirrhosis, precirrhotic (13) and cirrhotic (8). These tissues were examined for the presence of hyalin, mainly by light microscopy and in some cases, also by electron microscopy. Hyalin was detected in alcoholic liver disease and in prolonged cholestasis, mainly in primary biliary cirrhosis. It was not found in diseases in which cholestasis was of shorter duration and was predominantly central in location. Electron microscopically, hyalin was identical in alcoholic hepatitis and in primary biliary cirrhosis, although the pattern of injury of hepatocytic organelles was different in these diseases. A morphologic relation between hyalin and cholestasis or any other hepatocellular abnormalities could not be detected. Hyalin was also found in advanced nonalcoholic cirrhosis, in Wilson's disease, and in Indian childhood cirrhosis, and with exception of the last, it was always associated with peripheral cholestasis. Centrolobular hyalin in specimens with intact lobular architecture is diagnostic for alcoholic liver injury. Peripheral hyalin in the absence of cirrhosis favors primary biliary cirrhosis over extrahepatic biliary obstrution. Hyalin throughout nodules in advanced cirrhosis does not necessarily indicate alcoholic liver disease, Wilson's disease, or Indian childhood cirrhosis, but also occurs in "cryptogenic" cirrhosis.

4665 LYSOSOMAL DEFECT OF HEPATIC COPPER EXCRETION IN WILSON'S DISEASE (HEPATOLENTICULAR DEGENERATION). *(E.)* Sternlieb, I.; Van Den Hamer, C. J. A.; Morell, A. G.; Alpert, S.; Gregoriadis, G.; Scheinberg, I. H. (Albert Einstein Coll. Med., Bronx, N. Y.). *Gastroenterology* 64(1) 99-105, 1973.

After administration of ^{64}Cu, striking differences were found between the copper content, specific activity, and protein binding of copper in the subcellular pools of hepatic copper in a 35-yr-old woman with Wilson's disease compared with a 66-yr-old female with uncomplicated chronic cholecystitis and cholelithiasis. None of the subcellular pools in the control subject could be identified as the source of the biliary copper, but the very low specific activity of ^{64}Cu in lysosomes of the patient with Wilson's disease was virtually identical to that of the common duct bile and markedly different from all other subcellular pools. This suggests that lysosomes might be the source of biliary copper and that a lysosomal defect might account for the decrease in biliary copper excretion and the consequent hepatic accumulation of the metal in patients with Wilson's disease. This also suggests a possible means of therapy through replacement of missing lysosomal enzymes.

4666 LIVER TRANSPLANTATION IN MAN: THE FREQUENCY OF REJECTION, BILIARY TRACT COMPLICATIONS, AND RECURRENCE OF MALIGNANCY BASED ON AN ANALYSIS OF 26 CASES. *(E.)* Williams, R.; Smith, M.; Shilkin, K. B.; Herbertson, B.; Joysey, V.; Calne, R. Y. (King's Coll. Hosp., London, England). *Gastroenterology* 64(5):1026-1048, 1973.

Orthotopic liver allografts were performed on 26 patients for 9 primary hepatomas, of which 7 were hepatocellular carcinomas (2 with underlying cirrhosis) and 2 were intrahepatic cholangiocarcinomas; 5 carcinomas originating from the hepatic ducts or at their junction; 2 hepatic metastases; 8 cases of cirrhosis with liver failure; and 2 cases of biliary atresia. Immediate operative mortality was high: 9 patients died within 2 weeks of surgery. None of the 3 procedures used was superior with regard to postoperative complications. External biliary fistulas developed in 3 of 6 patients with direct suture of the common bile duct, in 2 of the 6 with an anastomosis between the gallbladder and common bile duct, and in 4 of the 5 with the gallbladder joined to a jejunal loop. Rejection was the principal cause of death in only 4 of the 17 patients who survived the immediate postoperative period, while septicemia was directly responsible for death in 10 of these 17 patients. Liver biopsy was a helpful diagnostic tool for distinguishing rejection from extrahepatic obstruction, cholangitis, infarction, or drug-induced hepatitis. Abnormal results in the leukocyte migration test paralleled other evidence of rejection in the early postoperative months. Minor episodes of rejection occurred in 6 patients, but they responded rapidly to a temporary increase in the dose of immunosuppressants. Tumors recurred in all 4 patients with adenocarcinomas at or near the hepatic duct who survived long enough to permit meaningful observations. In contrast, only 2 of 6 primary hepatomas recurred. One cirrhotic patient who died of biliary sepsis 25 weeks after transplantation had apparently developed a reticulum cell sarcoma of the liver although there was no evidence of a similar lesion in the donor. The only surviving patient, who originally had a primary hepatocellular carcinoma, is alive and well with normal liver function 3 1/2 yr after transplantation.

4667 THE NATURE OF THE COPPER COMPLEXES IN BILE AND THEIR RELATIONSHIP TO THE ABSORPTION AND EXCRETION OF COPPER IN NORMAL SUBJECTS AND IN WILSON'S DISEASE. *(E.)* Lewis, K. O. (Dept. Biochem., Univ. Zambia, Lusaka). *Gut* 14(3):221-232, 1973.

Copper in bile has been shown by electrophoresis to occur neither as free ions nor as protein complexes but is associated with a component of the micellar complexes of bile as a complex of low molecular weight constituents. Solvent fractionation studies suggest that the bile salt components of the lecithin-bile salt complexes are the active binding agents. The effects of specific bile salts on the behavior of copper during electrophoresis support this possibility. More specifically, the absence of 'cationic' copper, even after the addition of cupric ions to bile was reproduced by an aqueous solution of sodium taurocholate. Similarly, poor recoveries of copper from bile by chelation-extraction methods was reproduced by aqueous solutions of sodium glycocholate or taurochenodeoxycholate. The relation of certain bile salts to the excretion of copper in man during the time that an external biliary fistula was functioning and to the intestinal absorption of copper in the rat confirmed this concept. The results show that copper in bile is associated with taurochenodeoxycholate. The proportion of taurochenodeoxycholate is reduced in the bile of patients with Wilson's disease which may account for elevated tissue copper levels found in this disease. A rational therapy would appear to be administration of this bile salt in encapsulated form for liberation in the duodenum.

4668 STUDIES ON THE MECHANISM OF INHIBITION OF ACUTE ALCOHOLIC FATTY LIVER BY CLOFIBRATE. *(E.)* Kahonen, M. T.; Ylikahri, R. H.; Hassinen, I. (Dept. Med. Chem., Univ. Helsinki, Finland). *Metabolism* 21(11):1021-1028, 1972.

The effect of ethanol on hepatic α-glycerophosphate, dihydroxyacetone phosphate, and triglyceride concentrations, and on serum levels of triglycerides and free fatty acids was studied 4 and 12 hr after administration of ethanol to normal and clofibrate-treated rats. In the normal rats, ethanol increased liver α-glycerophosphate and triglyceride concentrations, α-glycerophosphate: dihydroxyacetone phosphate ratio, and serum free fatty acid concentration. In the clofibrate-treated rats there was no change in α-glycerophosphate ratio or α-glycerophosphate concentration after ethanol, nor was there a significant rise in liver triglyceride concentration. Ethanol and glucose did not influence the concentration in either group of animals. The initial serum triglyceride concentration in the clofibrate-treated rats was about 30% of that in the normal animals. In normal rats, ethanol administration produced a higher serum triglyceride concentration than glucose; ethanol caused a 4-fold increase by 12 hr. The difference between 12 hr values in glucose- and ethanol-treated clofibrate rats was not significant. Thus, it appears that clofibrate treatment can inhibit the ethanol-induced change in the hepatic redox state *in vivo* as in the isolated liver. These results strengthen the view that clofibrate inhibits the production of acute ethanolic fatty liver, at least in part by inhibiting the ethanol-induced change in the hepatic redox state and the increase in the hepatic α-glycerophosphate concentration.

4669 THE TREATMENT OF JAUNDICE DUE TO LIVER METASTASES BY QUADRUPLE CHEMOTHERAPY. *(E.)*

Hughes, J.; Stoker, T. A. M. (Westminster Hosp., London, England). *Postgrad. Med. J.* 49(570):265-267, 1973.

Quadruple chemotherapy was used to treat liver metastases in 7 patients with breast carcinomas (4), gastric carcinoma (1), alveolar rhabdomyosarcoma of the foot (1), and oat-cell carcinoma of the bronchus (1). Chemotherapy consisted of 2 doses of cyclophosphamide (200-300 mg on days 1 and 5), 2 doses of methotrexate (0.25 mg/kg/day on days 1 and 4), 2 doses of vincristine (0.015 mg/kg/day on days 2 and 5), and 5-fluorouracil (7.5 mg/kg/day for 5 days). Courses of treatment were generally given at 3-week intervals. Alopecia developed in all patients, but in those surviving longer than 3 months, there was a regrowth of hair. Nausea occurred in all but was easily controlled. Jaundice was relieved in all but the patient with oat-cell carcinoma. Three patients survived for 1 yr or more and 2 were able to lead a normal life. The longest survival time was 20 months for the patient with the rhabdomyosarcoma. One patient who had a breast tumor is alive and well 18 months after initiation of chemotherapy.

4670 PENICILLAMINE-INDUCED CUPRIURIA IN NORMAL SUBJECTS AND IN PATIENTS WITH ACTIVE LIVER DISEASE. *(E.)*

Lynch, R. E.; Lee, G. R.; Cartwright, G. E. (Univ. Utah, Coll. Med., Salt Lake City). *Proc. Soc. Exp. Biol. Med.* 142(1):128-130, 1973.

The urinary excretion of copper was measured in 4 normal subjects and in 6 patients with chronic active liver disease following p.o. administration of 1.5 g of D-penicillamine/day. Diagnoses included: chronic active hepatitis (2); cryptogenic cirrhosis (2); alcoholic hepatitis (1); and toxic hepatitis (1). None had any symptom of Wilson's disease; serum copper and ceruloplasmin concentrations were normal or increased. All individuals excreted a maximum of 663-1390 μg/day of copper in the urine, and there was no difference between the 2 groups. Since patients with Wilson's disease excrete more than 1400 μg/day of copper in the urine following penicillamine therapy, this test may be of value in differentiating patients with Wilson's disease from patients with chronic active liver disease.

4671 CONGENITAL HEPATIC FIBROSIS AND NEPHRONOPHTHISIS. A FAMILY STUDY. *(E.)*

Boichis, H.; Passwell, J.; David, R.; Miller, H. (Chaim Sheba Med. Ctr., Tel Hashomer, Israel). *Q. J. Med.* 42 (165):221-233, 1973.

An association of congenital hepatic fibrosis and nephrophthisis is reported in 3 of 7 children of consanguineous Iraqi Jewish parents. Neither of the parents had any evidence of liver or kidney disease. Two brothers died of renal failure at age 14 and 7 yr, resp., and a third is being maintained on renal dialysis. Their 12 1/2-yr-old brother has mild hepatomegaly and slightly increased serum alkaline phosphatase activity, and a 10-yr-old sister, on her first examination, had hepatomegaly and moderately increased serum transaminase and alkaline phosphatase activities which later returned to normal; she also has impaired urinary concentration. Congenital hepatic fibrosis was diagnosed at autopsy in the 2 brothers who died. Histological examination revealed pure fibrosis with no bile duct proliferation. Liver disease was mild in all of the 3 brothers who progressed to renal failure; none of them had any clinical manifestations of liver disease. This is the first known report of an association between congenital hepatic fibrosis and nephrophthisis.

4672 PERITONEAL DIALYSIS IN HYPONATREMIA DUE TO LIVER FAILURE. *(E.)*

Ring-Larsen, H.; Clausen, E.; Ranek, L. (Univ. Hosp., Copenhagen, Denmark). *Scand. J. Gastroenterol.* 8(1):33-40, 1973.

Patients with severe hyponatremia due to advanced liver failure and concurrent impairment of renal function were treated with peritoneal dialysis against hypertonic solutions. The patients (7 male and 10 female, aged 12-69 yr) were diagnosed as follows: cryptogenic cirrhosis (6); alcoholic cirrhosis (6); halothane hepatitis (2); viral hepatitis (2); and common duct stone with portal thrombosis (1). It was possible with this procedure to elevate the serum sodium towards normal values for some time. Likewise, the serum potassium disturbances could be corrected. However, no change in hepatic encephalopathy or in liver function tests occurred. The renal function was not significantly influenced by the procedure. The death rate was normal for patients with this syndroms. Complications due to the procedure, i.e. hemorrhage from the abdominal wound when the catheter was withdrawn and pulmonary edema, caused 2 deaths. Protein loss and peritonitis must be guarded against during the procedure. Correction of severe electrolyte disturbances, achieved by peritoneal dialysis, may eliminate one life threatening factor in severe liver failure, but whether this improves the survival rate significantly is unknown.

4673 LIPOPROTEIN-X (LP-X) IN LIVER DISEASE. *(E.)*

Ritland, S.; Blomhoff, J. P.; Elgjo, K.; Gjone, E. (Rikshospital, Oslo, Norway). *Scand.*

J. Gastroenterol. 8(2):155-160, 1973.

Qualitative tests for lipoprotein-X (LP-X) were performed by immunoelectrophoresis on sera from 109 patients with various liver disorders and on 20 normal subjects. Of 74 biopsied patients, 23 had positive LP-X tests and histological evidence of cholestasis; none of the 46 patients with negative LP-X tests had cholestasis. No evidence of cholestasis was found in liver biopsies from the remaining 5 patients who had positive LP-X tests, but all 5 had increased serum alkaline phosphatase activities. Positive LP-X tests were found in 2 of 37 patients with chronic hepatitis, 4 of 8 with early acute hepatitis, 0 of 9 with late stage acute hepatitis, 13 of 14 with biliary cirrhosis, 8 of 8 with large duct obstruction, and 7 of 17 with cirrhosis. This study confirms previous reports of the reliability and sensitivity of the LP-X test in demonstrating or excluding cholestasis.

4674 THE TREATMENT OF METASTATIC CARCINOMA OF THE LIVER BY THE PERCUTANEOUS SELECTIVE HEPATIC ARTERY INFUSION OF 5-FLUOROURACIL. *(E.)* Tandon, R. N.; Bunnell, I. L.; Cooper, R. G. (Dept. Med., State Univ. New York, Buffalo). *Surgery* 73(1):118-121, 1973.

Metastatic adenocarcinoma of the liver in 122 patients was treated by intraarterial infusion with 5-fluorouracil (25-30 mg/kg/day for 7-9 days) following percutaneous catheterization of the major arterial supply of the tumor bed. Primary tumor sites were: colon (67), pancreas (21), stomach (6), gallbladder (3), breast (16), others (6), and unknown (3). A remission rate of 64% was obtained as opposed to 15% which is routinely obtained by i.v. fluorouracil therapy. This percutaneous transfemoral artery approach allows successful therapy in the most advanced cases without the risk of general anesthesia. In those patients showing an objective response a significant prolongation of life occurred. All patients were maintained on 5-fluorouracil at 15 mg/kg i.v. once a week for 6 months.

4675 BUDD-CHIARI SYNDROME DUE TO LEIOMYOSARCOMA OF THE INFERIOR VENA CAVA. *(E.)* Justiniani, F. R.; Cohen, G. H.; Roen, S. A.; Arribas, I.; Kushner, D. S. (Mt. Sinai Med. Ctr., Miami Beach, Fla.). *Am. J. Dig. Dis.* 18(4):337-346, 1973.

4676 EFFECT OF OXYPHENBUTAZONE ON LIVER FUNCTION IN MAN. *(E.)* Pentikainen, L. A.; Mustala, O. O. (Kivela Hosp., Helsinki, Finland). *Ann. Clin. Res.* 4(5):296-299, 1972.

4677 IN VITRO EXTRACORPOREAL LIVER SLICES AND CELL SUSPENSIONS FOR TEMPORARY HEPATIC SUPPORT. *(E.)* Soyer, T.; Lempinen, M.; Eiseman, B. (Denver Gen. Hosp., Colo.). *Ann. Surg.* 177(4):393-401, 1973.

4678 COMPENSATORY HYPERTROPHY OF THE LATERAL QUADRANT OF THE LEFT HEPATIC LOBE DUE TO ATROPHY OF THE REST OF THE LIVER, APPEARING AS A MASS IN THE LEFT UPPER QUADRANT OF THE ABDOMEN: REPORT OF A CASE. *(E.)* Tsuzuki, T.; Hoshino, Y.; Uchiyama, T.; Kitazima, M.; Mikata, A.; Matsuki, S. (Keio Univ. Sch. Med., Tokyo, Japan). *Ann. Surg.* 177(4):406-410, 1973.

4679 RESULTS IN 107 HEPATIC LOBECTOMIES WITH A PRELIMINARY REPORT ON THE USE OF A CLAMP TO REDUCE BLOOD LOSS. *(E.)* Lin, T. Y. (Natl. Taiwan Univ. Hosp., Taipei). *Ann. Surg.* 177(4):413-421, 1973.

4680 HEPATIC LESION IN CHICKENPOX: A CASE REPORT. *(E.)* Eshchar, J.; Reif, L.; Waron, M.; Alkan, W. J. (Asaf Harofe Govt. Hosp., Zrifin, Israel). *Gastroenterology* 64(3):462-466, 1973.

4681 HYPOXIA AND ASYMETRICAL FIBROSIS OF THE LIVER IN CHILDREN. *(E.)* Ghosh, M. L.; Emery, J. L. (Children's Hosp., Sheffield, England). *Gut* 14(3):209-212, 1973.

4682 ANGIOGRAPHY FOR HEPATIC HEMANGIOMAS. *(Fr.)* Tavernier, J.; Diard, F.; Delorme, G.; Larroude, C.; Grelet, P. (St. Andre Hosp., Bordeaux, France). *J. Radiol. Electrol. Med. Nucl.* 53(6/7):493-499, 1972.

4683 THROMBOSIS OF SMALL SUBHEPATIC VEINS: DIAGNOSTIC VALUE OF SUBHEPATIC PHLEBOGRAPHY. *(Fr.)* Vasile, N.; Dhumeaux, D.; Rochant, H.; Grellet, J.; Ferrane, J. (Henri Mondor Hosp., Creteil, France). *J. Radiol. Electrol. Med. Nucl.* 53(6/7):501-504, 1972.

4684 HISTOCHEMICAL DEMONSTRATION OF ACID MUCOPOLYSACCHARIDES IN SANFILIPPO'S DISEASE: AN ULTRASTRUCTURAL STUDY OF THE LIVER. *(E.)* Konyar, E.; Tondeur, M.; Resibois, A. (St. Pierre Univ. Hosp., Brussels, Belgium). *Virchows Arch. (Zellpathol.)* 11:224-233, 1972.

4685 HEPATOCARCINOMA WITH BILIARY OBSTRUCTION. REPORT OF A CASE AND REVIEW OF THE LITERATURE. *(E.)* Elsner, B.; Jauregui, E. M. (Cent. Educ. Med. Invest. Clin., Buenos Aires, Argentina). *Acta Gastroenterol. Latinoam.* 4(3):111-116, 1972.

4686 A BIOPSY CASE OF WILSON'S DISEASE: PATHOLOGICAL CHANGES IN PERIPHERAL NERVES. *(E.)* Miyakawa, T.; Murayama, E.; Sumiyoshi, S.; Deshimaru, M.; Miyakawa, K. (Kumamoto Univ. Sch. Med., Japan). *Acta Neuropathol. (Berl.)* 24(2):174-177, 1973.

4687 RAPID UPTAKE OF DIETARY CHOLESTEROL BY HYPERPLASTIC LIVER NODULES AND PRIMARY HEPATOMAS. *(E.)* Horton, B. J.; Mott, G. E.; Pitot, H. C.; Goldfarb, S. (McArdle Lab. Cancer Res., Univ. Wisconsin, Madison). *Cancer Res.* 33(3):460-464, 1973.

4688 DEPRESSION OF LYMPHOCYTE REACTIVITY TO PHYTOHEMAGGLUTININ BY SERUM FROM PATIENTS WITH LIVER DISEASE. *(E.)* Newberry, W. M.; Shorey, J. W.; Sanford, J. P.; Combes, B. (Univ. Texas S.W. Med. Sch., Dallas). *Cell. Immunol.* 6(1):87-97, 1973.

4689 EXPERIENCE IN LIVER TRANSPLANTATION. *(E.)* Bhalerao, R. A. (R. E. M. Hosp., Parel, Bombay, India). *Q. J. Surg. Sci.* 8(3): 123-129, 1972.

4690 THE LYMPHSYSTEM OF THE LIVER. 1. INDIRECT VISUALIZATION OF THE LIVER LYMPHATICS WITH PATENTBLUE-DYE UNDER PERITONEOSCOPY. *(E.)* Meyer-Burg, J. (Steglitz Clin., Free Univ. Berlin, Germany). *Endoscopy* 4:219-221, 1972.

4691 MECHANISM AND PREDICTION OF DRUG-INDUCED LIVER DISEASE. *(E.)* Berthelot, P. (INSERM, Hosp. Henri Mondor, Creteil, France). *Gut* 14(4):332-339, 1973.

4692 HEPATOSPLENOMEGALY, ABDOMINAL PAIN, ANEMIA, AND BONE LESIONS. *(E.)* Amromin, G. D.; Beutler, E.; Comings, D.; Gildenhorn, H.; Gordon, H.; Levine, R.; Marasso, F.; Matern, D. I.; Meerkreebs, G.; Rosen, R. B.; Van de Water, J. M.; Wood, L. A. (City of Hope Natl. Med. Ctr., Duarte, Calif.). *J.A.M.A.* 224(4):502-510, 1973.

4693 HEPATOMA WITH UNUSUAL ASSOCIATIONS. *(E.)* Herring, B. D. (Merrit Hosp., Oakland, Calif.). *J. Natl. Med. Assoc.* 65(3):198-200, 1973.

4694 PLASMA EXCHANGE IN TREATMENT OF PROFOUND HEPATIC COMA. *(E.)* Cree, I. C.; Straus, E.; Berger, S.; Voges, P.; Scotti, P.; Atkins, P. (New York Med. Coll., Metropolitan Hosp. Med. Center, N.Y.). *N.Y. State J. Med.* 73(3):569-576, 1973.

4695 IMMUNOHISTOCHEMICAL STUDIES OF LIVER TISSUES. *(E.)* Kater, L.; Borst-Eilers, E.; van Gorp, L. H. M. (St. Antonius Hosp., Utrecht, Netherlands). *Pathol. Eur.* 7(3/4):299-306, 1972.

4696 HEPATIC GLYCOGEN STORAGE DURING UNCONTROLLED DIABETES MELLITUS. *(E.)* Berman, M. C.; Berelowitz, M. (Dept. Chem. Pathol., Univ. Cape Town, South Africa). *S. Afr. Med. J.* 47(5): 184-186, 1973.

4697 HEPATIC RESECTION. *(E.)* Goldsmith, H. S. (Jefferson Med. Coll., Philadelphia, Pa.). *Surg. Clin. N. Am.* 53(3):703-709, 1973.

4698 MANAGEMENT OF A PYOGENIC ABSCESS OF THE LIVER. *(E.)* Goldsmith, H. S.; Chen, W. F. (Jefferson Med. Coll., Philadelphia, Pa.). *Surg. Clin. N. Am.* 53(3):711-715, 1973.

4699 ANATOMIC HEPATIC LOBECTOMY IN TRAUMA TO THE LIVER. *(E.)* Donovan, A. J.; Michaelian, M. J.; Yellin, A. E. (Univ. S. California Med. Ctr., Los Angeles). *Surgery* 73(6):833-847, 1973.

4700 HEPATIC ULTRASTRUCTURES IN REYE'S SYNDROME. *(E.)* Brown, R. E.; Madge, G. E. (Med. Coll. Virginia, Richmond). *Va. Med. Mon.* 99(12):1295-1300, 1972.

See also, 4133, 4151, 4225, 4226, 4228, 4229, 4236, 4241, 4243, 4248, 4249, 4257, 4264, 4269, 4270, 4281, 4283, 4284, 4292, 4293, 4607, 4755, 4786, 4905, 4915, 4916, 4921, 4930, 4931, 4934, 4939, 4944.

LIVER AND BILIARY TRACT

Hyperbilirubinemic States

4701 INFLUENCE OF PHOTOTHERAPY ON UNCONJUGATED BILIRUBIN IN DUODENAL BILE OF NEWBORN INFANTS WITH HYPERBILIRUBINEMIA. A PRELIMINARY STUDY. *(E.)* Lund, H. T.; Jacobson, J. (Copenhagen County Hosp., Glostrup, Denmark). *Acta Paediatr. Scand.* 61:693-696, 1972.

The concentration of unconjugated bilirubin was measured in duodenal bile in 12 newborn infants with hyperbilirubinemia (serum bilirubin concentration ≥100 mg/l) without signs of isoimmunization. Of these 12 infants, 7 received phototherapy for 24 hr between bile samples, while 5 had no treatment. During phototherapy the duodenal bile changes from pure yellow to brownish-black. The concentration of unconjugated bilirubin in the duodenal bile was doubled during phototherapy. The concentration of unconjugated bilirubin in duodenal bile never exceeded the serum bilirubin concentration. The maximum concentration of unconjugated bilirubin was 75 mg/liter, corresponding to a serum bilirubin concentration of 218-170 mg/liter.

4702 RESERVE ALBUMIN BINDING CAPACITY, SALICYLATE SATURATION INDEX, AND RED CELL BINDING OF BILIRUBIN IN NEONATAL JAUNDICE. *(E.)* Bratlid, D. (Rikshospital, Oslo, Norway). *Arch. Dis. Child.* 48(5):393-397, 1973.

The reserve albumin binding capacity [2(4'-hydroxyazobenzene)benzoic acid method], salicylate saturation index, and erythrocyte-bound bilirubin were determined on 105 blood samples taken from 72 jaundiced newborns who were given exchange transfusions. Total plasma bilirubin concentrations ranged from 2.2 to 32.0 mg/100 ml (mean of 12.5 mg/100 ml). Erythrocyte-bound bilirubin ranged from 0.3 to 6.1 mg/100 ml, with 2 samples having much higher levels than the others. The patients from whom these samples came had signs of bilirubin encephalopathy, and kernicterus was confirmed at autopsy in the 1 of these infants. The other responded to several exchange transfusions and albumin administration. The albumin binding capacities and salicylate saturation indices were not indicative of the development of kernicterus in these 2 patients but were abnormal in 2 and 48 samples, resp. from newborns who did not develop kernicterus. Thus, the erythrocyte-bound bilirubin, but not the reserve albumin binding capacity or salicylate saturation index, appears to be useful in determining which infants are in danger of developing kernicterus.

4703 PREGNANCY, ORAL CONTRACEPTIVES, AND CHRONIC FAMILIAL JAUNDICE WITH PREDOMINANTLY CONJUGATED HYPERBILIRUBINEMIA (DUBIN-JOHNSON SYNDROME). *(E.)* Cohen, L.; Lewis, C.; Arias, I. M. (Albert Einstein Coll. Med., Bronx, N.Y.). *Gastroenterology* 62(6):1182-1190, 1972.

Dubin-Johnson syndrome was diagnosed as the primary disorder in 27 of 101 women who developed jaundice during pregnancy (9) or administration of oral contraceptives (18). Both pregnancy and oral contraceptives increased mean serum direct bilirubin by 100% and mean serum indirect bilirubin by 60% above basal levels. Patients taking norethynodrel-mestranol (16) and chlormadinone acetate-mestranol (2) developed jaundice during the first 3 cycles of drug administration; 7 of 8 previously pregnant patients had histories of asymptomatic jaundice late in pregnancy. In all cases, jaundice disappeared within 5 days of drug discontinuation, and serum bilirubin returned to pretreatment levels within 7 days. Of the 9 pregnant patients, 4 became jaundiced in the 2nd trimester and 5 in the 3rd. Serum bilirubin levels returned to prepregnancy levels within 10 days after delivery. BSP retention (Mandema test) at 90 min was increased in 8 of 10 patients, but hepatic BSP storage was normal and the T_m was virtually zero in all 10, including the 2 patients with negative Mandema tests. Aspiration liver biopsies showed the characteristic brown-black intracellular pigment, particularly in centrilobular areas, in the 22 patients examined. Examination of 78 family members (47 males and 31 females) revealed 8 previously unrecognized cases of Dubin-Johnson syndrome, 5 of which were in males. If it is assumed that the syndrome is transmitted as an autosomal recessive characteristic, 26 children and 15 parents were identified as genetically obligate heterozygotes.

4704 HEPATIC HANDLING OF UNCONJUGATED DYES IN THE DUBIN-JOHNSON SYNDROME. *(E.)* Erlinger, S.; Dhumeaux, D.; Desjeux, J. F.; Benhamou, J. P. (Beaujon Hosp., Clichy, France). *Gastroenterology* 64(1):106-110, 1973.

The plasma disappearance curves for BSP, dibromsulphalein, ^{125}I-rose bengal and indocyanine green have been compared in 2 patients with the Dubin-Johnson syndrome. BSP, the only one of these 4 compounds to undergo conjugation by hepatocytes before being excreted into the bile, was also the only one to show a secondary rise in plasma concentration after the normal initial fall. The transport maximum value for dibromsulphalein, estimated in 1 of the patients, was significantly lower (2.3 mg/min) than the mean value in 8 normal subjects (7.4 mg/min). This suggests that the absence of secondary rise in the plasma disappearance curve of dibromsulphalein cannot be attributed to its being more effectively excreted in the bile than BSP. The findings are consistent with the hypothesis that the reentry of BSP into the plasma in the Dubin-Johnson syndrome is related to its conjugation, conjugated compounds having a lower binding affinity for hepatic cytoplasmic proteins than unconjugated compounds.

4705 INHERITANCE OF TYPE 2 CRIGLER-NAJJAR HYPERBILIRUBINAEMIA. *(E.)* Hunter, J. O.; Thompson, R. P. H.; Dunn, P. M.; Williams, R. (King's Coll. Hosp., London, England). *Gut* 14(1): 46-49, 1973.

Slightly increased serum bilirubin levels were found in all 6 parents and some other relatives of 3 patients (a 21-yr-old man and 2 infants) with Crigler-Najjar type 2 hyperbilirubinemia. Bilirubin levels in the patients varied widely and ranged up to 21.5 mg/100 ml with no conjugated pigment, suggesting that these patients, as well as those with type 1, can develop kernicterus. Phenobarbital and, in 1 patient, dicophane (DDT) reduced bilirubin levels. It is suggested that these 3 patients, with bilirubin levels much higher than those of their parents, are heterozygous for each of 2 different, slightly abnormal genes.

4706 BENIGN FAMILIAL RECURRENT INTRAHEPATIC CHOLESTASIS. *(E.)* Lesser, P. B. (Irwin Army Hosp., Fort Riley, Kans.). *Am. J. Dig. Dis.* 18(4):259-264, 1973.

4707 HYPERBILIRUBINAEMIA IN ACUTE HAEMORRHAGIC STROKE. *(E.)* Herishanu, Y.; Mazal, S.; Lavy, S. (Shaare Zedek Gen. Hosp., Jerusalem, Israel). *J. Neurol. Sci.* 17(4):369-372, 1972.

4708 THE RESULTS OF SURGICAL TREATMENT OF MALIGNANT HEPATIC TUMORS. *(E.)* Zhuravlev, V. A.; Korepanov, V. I.; Vasiljev, P. N. (Res. Inst. Blood Transfusion, Kirov, U.S.S.R.). *Vopr. Onkol.* 18(10):36-42, 1972.

4709 INHIBITION OF CHOLERESIS AND BILIRUBIN EXCRETION IN RATS CAUSED BY SERA OF DIABETIC MOTHERS. *(E.)* Jirsova, V.; Heringova, A.; Jirsa, M. (1st Med. Clin., Charles Univ., Prague, Czechoslovakia). *Biol. Neonate* 21:296-302, 1972.

4710 GLUCOSE-6-PHOSPHATE-DEHYDROGENASE DEFICIENCY IN NIGERIANS WITH JAUNDICE ASSOCIATED WITH LOBAR PNEUMONIA. *(E.)* Tugwell, P. (Ahmadu Bello Univ., Zaria, Nigeria). *Lancet* 1(7810):968-970, 1973.

4711 JAUNDICE DURING PREGNANCY. *(E.)* Rencoret, R.; Aste, H. (Naval Hosp., Valparaiso, Chile). *Med. J. Aust.* 1(4):167-169, 1973.

See also, 4121, 4152, 4280, 4369, 4649, 4676.

LIVER AND BILIARY TRACT

Nonviral Hepatitis and Hepatic Injury

4712 PELIOSIS HEPATIS. POSSIBLE ETIOLOGIC ROLE OF ANABOLIC STEROIDS. *(E.)* Naeim, F.; Copper, P. H.; Semion, A. A. (Sch. Med., Univ. California, Los Angeles). *Arch. Pathol.* 95(4): 284-285, 1973.

A 26-yr-old man hospitalized with Fanconi's disease and a fever of undetermined origin was given isoniazid, chlortetracycline, cephalothin, and blood and platelet transfusions followed, 1 week after admission, by fluoxymesterone (50 mg/day). Progressive increases occurred in serum bilirubin, SGOT, SGPT, and serum alkaline phosphatase values. The patient's hematological status deteriorated and he died 15 weeks after admission. Autopsy showed multiple deep red to purple areas, 0.1-0.5 cm in diameter, on the cut surface of the liver. Microscopic examination revealed multiple small blood-filled spaces and numerous focal areas of necrosis scattered throughout the liver but more numerous near the capsule. Cytomegalic inclusions were found in occasional hepatocytes, but none of these inclusions were present in or around the necrotic foci. A 65-yr-old woman with diabetes, who was hospitalized with congestive heart failure died after 2 days. Microscopic findings on the liver at autopsy included multiple foci of hepatocyte necrosis associated with a few extravasated RBC or irregular blood-filled spaces. This patient had received 0.625-1.25 mg/day of estrone sulfate for 18 months prior to hospitalization for postmenopausal complaints. These 2 cases of peliosis hepatis and 7 others reported in the literature suggest that androgens, estrogens, or both may be etiological factors.

4713 1,2-DICHLOROETHANE POISONING. *(E.)* Yodaiken, R. E.; Babcoch, J. R. (Dept. Pathol., Emory Univ., Atlanta, Ga.). *Arch. Environ. Health* 26(5):281-284, 1973.

About 2 hr after ingestion of 15 ml of 1,2-dichloroethane, a 14-yr-old boy developed symptoms which included headache and a staggered gait. Progressive increases developed in the blood urea nitrogen, the prothrombin time, and activities of serum alkaline phosphatase, LDH, and SGOT. The blood glucose level decreased to 12 mg/100 ml on the 3rd day. This hypoglycemia is attributed primarily to liver necrosis. By the 4th day, serum calcium levels had risen to 14.5 mg/100 ml and the inorganic phosphate to 7.3 mg/100 ml although no calcium had been administered. One possible explanation for the hypercalcemia may be an inappropriate release of parathyroid hormone from damaged parathyroid glands. Deficiencies were found in all clotting factors except for factor VIII. The patient died on the 6th day. Autopsy showed significant abnormalities in the liver, kidneys, and adrenals. Microscopic examination revealed extensive necrosis of liver tissue, with only scattered vacuolated cells and islets of surviving parenchyma. The location of surviving tissue near or around central veins and portal triads differs from the zonal necrosis found in carbon tetrachloride poisoning. Fat stains confirmed the presence of fat in the vacuoles of the parenchymal cells and the midzonal distribution of the necrosis. This massive liver necrosis and renal tubular necrosis were the major causes of death. It is recommended that measures be taken to correct the hypoglycemia and hypercalcemia which develop in the course of 1,2-dichloroethane poisoning.

4714 INTRAHEPATIC CHOLESTASIS DUE TO THERAPY OF RHEUMATOID ARTHRITIS. *(E.)* Schenker, S.; Olson, K. N.; Dunn, D.; Breen, K. J.; Combes, B. (Vanderbilt Univ. Med. Sch., Nashville, Tenn.). *Gastroenterology* 64(4):622-629, 1973.

Reports are presented for 2 patients who developed hepatic disease with predominant intrahepatic cholestasis as a result of therapy for rheumatoid arthritis. In the 1st patient, a 66-yr-old male, the obstructive jaundice could resonably be ascribed to gold therapy alone (3 injections of 50 mg gold sodium thiomalate i.m. over a 25-day period). In the second individual, a 34-yr-old female, either gold or phenylbutazone was implicated. Both patients had protracted and severe hepatic dysfunction. Rare reactions to these agents must be considered in the differential diagnosis of obstructive jaundice in patients being treated for rheumatoid arthritis.

4715 METHIMAZOLE-INDUCED JAUNDICE. *(E.)* Fischer, M. G.; Nayer, H. R.; Miller, A. (Mt. Sinai Sch. Med., New York, N.Y.). *J.A.M.A.* 223(9):1028-1029, 1973.

Unlike some drug-induced hepatitis, about half of the cases of methimazole-induced hepatitis continue for 8-10 weeks after the drug is discontinued. The total serum bilirubin may continue to rise for several weeks, and the jaundice is prolonged and progressive. If discontinuation of the drug fails to produce resolution of the process, percutaneous tranhepatic cholangiography should be performed. If the biliary system cannot thus be visualized, a period of at least 10 weeks must be allowed to elapse, despite the deepening jaundice, before the diagnosis of methimazole-induced hepatitis can be abandoned and laparotomy considered. The case examined was a 74-yr-old female undergoing methimazole therapy for suspected hyperfunctioning thyroid adenoma. She received 10 mg 4 times/day plus 0.5 mg/day digoxin. Her total bilirubin was 13.6 mg/100 ml and alkaline phosphatase was 270 IμU/ml.

4716 A HISTOLOGICAL ANALYSIS OF GRANULOMATOUS HEPATITIS. *(E.)* Hughes, M.; Fox, H. (Dept. Pathol., Univ. Manchester, England). *J. Clin. Pathol.* 25(9):817-820, 1972.

A study has been made of 33 cases of granulomatous hepatitis in the hope that a histological review might reveal characteristics common to specific causes of such a hepatitis. Of the 33, 12 were established as cases of sarcoidosis, 9 as tuberculosis, and 4 as primary biliary cirrhosis. No clinical diagnosis was reached in 6 cases. Histological features of these cases show that the presence of caseation or of tubercle bacilli will only allow for the diagnosis of approximately 50% of tuberculosis cases. Histological features suggestive of tuberculosis are a paucity of granulomata, a scantiness of giant cells, a relatively mild surrounding chronic inflammatory cell infiltrate, and an absence of reticulin. The granulomata are more likely to be due to sarcoidosis if they are more numerous, contain many giant cells, are confined to the portal areas, and show a well marked surrounding non-specific chronic inflammatory cell infiltrate. Primary biliary cirrhosis is distinguished easily from sarcoidosis or tuberculosis by the presence of lymphoid foci and destructive lesions of small bile ducts, together with well marked inflammatory cell infiltrates. Histological features of cases in which no clinical diagnosis was reached suggest that they are more likely to be due to sarcoidosis than to tuberculosis.

4717 WOUNDS OF THE LIVER IN VIETNAM: A CRITICAL ANALYSIS OF 254 CASES. *(E.)* Carroll, C. P.; Cass, K. A.; Whelan, Jr., T. J. (Office Surg. Gen., Dept. Army, Washington, D.C.). *Ann. Surg.* 177(4):385-392, 1973.

4718 FAMILIAL GIANT CELL HEPATITIS: REPORT OF TWO CASES AND REVIEW OF THE LITERATURE. *(E.)* Greco, M. A.; Finegold, M. J. (Bellevue-New York Univ. Med. Ctr., New York). *Arch. Pathol.* 95(4):240-244, 1973.

4719 PATHOLOGY OF LIVER NECROSIS AND REGENERATION AFTER ADMINISTRATION OF DIMETHYLNITROSAMINE IN MASSIVE DOSES. *(E.)* Kuster, G. G. R.; Woods, J. E.; Ludwig, J. (Mayo Clin., Rochester Minn.). *J. Surg. Oncol.* 5(1):9-16, 1973.

4720 LIVER INJURY FROM ELIXIR OF TERPIN HYDRATE WITH CODEINE. *(E.)* Faierman, D.; Jacobs, S. (City Hosp. Ctr., Elmhurst, N.Y.). *Mt. Sinai J. Med. N.Y.* 40(1):56-59, 1973.

4721 HEPATIC MANIFESTATIONS DURING AMOEBIC DYSENTERY. *(E.)* Ramachandran, S.; Rajapakse, C. N. A.; De Saram, R.; Sivalingam, S. (Colombo North Gen. Hosp., Ragama, Sri Lanka). *Postgrad. Med. J.* 49(570):261-264, 1973.

4722 HALOTHANE HEPATITIS: FACT OR FALLACY? *(E.)* Simpson, B. R.; Strunin, L.; Walton, B. (London Hosp., England). *Proc. R. Soc. Med.* 66(1):56-63, 1973.

4723 HALOTHANE HEPATOTOXICITY. IS HALOTHANE HEPATOTOXICITY AN ALLERGIC REACTION TO HALOTHANE? *(E.)* Davies, G. E. (Imperial Chemical Industries Ltd., Alderley Park near Macclesfield, Cheshire, England). *Proc. R. Soc. Med.* 66(1): 55-56, 1973.

4724 PRIMARY HEPATIC ACTINOMYCOSIS: REPORT OF A PATIENT CURED WITH MEDICAL TREATMENT. *(Sp.)* Forteza, M. E.; Mana, E.; Torres, V. G. (U.N.C. Med. Clin., Cordoba, Argentina). *Prensa Med. Argent.* 59(13):506-513, 1972.

See also, 3952, 4286, 4754, 4773.

LIVER AND BILIARY TRACT

Acute Viral Hepatitis

4725 A PREVIOUSLY UNRECOGNISED LABORATORY HAZARD: HEPATITIS B ANTIGEN-POSITIVE CONTROL AND DIAGNOSTIC SERA. *(E.)* Wetli, C. V.; Heal, A. V.; Miale, J. B. (Univ. Miami Sch. Med., Fla.). *Am. J. Clin. Pathol.* 59(5):684-687, 1973.

Typing and control sera routinely used in the clinical laboratory were tested for the presence of hepatitis B antigen by radioimmunoassay. Of the 135 samples tested, 33.3% contained demonstrable hepatitis B antigen. The antigen was demonstrated in nearly 2/3 of the chemistry control sera, as well as typing and control sera used in the hematology, serology, and microbiology sections (40%, 24%, and 6%, resp.). It was concluded that commercial and non-commercial typing sera and serum controls present a serious hazard of serum hepatitis for all laboratory workers; that stringent, strictly enforced, safety precautions should be instituted in all clinical laboratories to minimize exposure to the agent of serum hepatitis; and that manufacturers of such sera, as well as appropriate governmental agencies, should attempt to minimize the potential health hazard of these products. Precautions should include the use of a strong detergent for washing hands, washing work areas with phenol, wearing disposable aprons, not allowing food, drink, or smoking in the area, and proper disposal of possibly contaminated articles.

4726 SUBTYPES OF HEPATITIS B ANTIGEN IN BLOOD DONORS AND POST-TRANSFUSION HEPATITIS: CLINICAL AND EPIDEMIOLOGICAL ASPECTS. *(E.)* Iwarson, S.; Magnius, L.; Lindholm, A.; Lundin, P. (Dept. Infect. Dis., Univ. Goteborg, Sweden). *Br. Med. J.* 1(5845):84-87, 1973.

Subtyping of hepatitis B (HB) antigen in blood donors revealed subtype *ad* in 56%, while patients with icteric post-transfusion hepatitis from the same center showed subtype *ay* in 75% of the cases. Donors with subtype *ad* in serum were mostly asymptomatic long-term carriers of the antigen with normal liver function (83%), while 70% of donors with subtype *ay* in serum had signs of acute or chronic liver disease. Healthy long-term carriers of HB antigen seem to present little risk of transmitting hepatitis, irrespective of subtype. Two donors who subsequently developed clinical hepatitis, both with subtype *ay* in the serum, had donated one unit of blood each during the incubation period of the disease. These units, when tested, were negative (by immunodiffusion) for HB antigen. However, clinical hepatitis developed in both recipients of these units. It is possible that the different distribution of subtypes *ad* and *ay* in blood donors and in post-transfusion hepatitis cases might reflect epidemiological circumstances rather than biological differences in the 2 viral strains.

4727 HEPATITIS B ANTIGEN INHIBITOR IN HUMAN FAECES AND INTESTINAL MUCOSA. *(E.)*

Piazza, M.; Di Stasio, G.; Maio, G.; Marzano, L. A. (Dept. Infect. Dis., Univ. Naples, Italy). *Br. Med. J.* 2(5862):334-337, 1973.

Hepatitis B antigen (HB Ag) positive sera became negative after *in vitro* incubation with homogenates of human feces or intestinal mucosa. This occurred in all sera tested by immunodiffusion, immunoelectrophoresis, and complement fixation. The activity of the inhibitor increased with the period of incubation at 37°C. Acholic feces (absence of stercobilin) from patients with obstructive jaundice had the same inhibitory activity as those of healthy subjects. Gastric juice had no inhibiting effect. These findings suggest the existence in the human intestine of a substance able to inactivate the HB Ag. It is not an antibody or similar to interferon. The presence of an inhibitor could explain why B-type hepatitis is seldom if ever fecally transmitted and the low oral infectivity of the B virus.

4728 VIRAL HEPATITIS DURING PREGNANCY. SEVERITY AND EFFECT ON GESTATION. *(E.)*

Borhanmanesh, F.; Haghighi, P.; Hekmat, K.; Rezaizadeh, K.; Ghavami, A. G. (Pahlavi Univ. Sch. Med., Shiraz, Iran). *Gastroenterology* 64(2): 304-312, 1973.

The severity of hepatitis during pregnancy and the effect of hepatitis on pregnancy and the fetus have been evaluated in southern Iran. The prospective study group included 34 pregnant women. Hospital records of 95 women of childbearing age with hepatitis were also analyzed retrospectively. Of these, 27 were pregnant. Among this total of 61 pregnant women there were 29 cases of fulminant hepatitis with 21 deaths. In the 68 nonpregnant women, 14 cases of fulminant hepatitis occurred with 12 deaths. This significantly increased frequency of fulminant hepatitis in pregnancy was indicative of a greater severity of hepatitis during pregnancy. Increased susceptibility to fulminant hepatitis was observed almost exclusively in the last trimester. Of the 21 fatalities and 29 fulminant cases, 81% and 83%, resp. occurred during the last trimester. In the nonfulminant group, 56% of the cases occurred in the last trimester. This increasing number of pregnant women with nonfulminant hepatitis in the later stages of pregnancy probably reflects patient referral rather than increasing susceptibility to hepatitis during pregnancy. Malnutrition and possibly hormonal changes of late pregnancy appeared to play a significant role in the pathogenesis of fulminant hepatitis in pregancy. Hepatitis also had a deleterious effect on the outcome of pregnancy and the survival of the fetus including termination of pregnancy, prematurity, and fetal wastage, which were directly related to the severity of hepatitis.

4729 LIVER MORPHOLOGY IN ACUTE VIRAL HEPATITIS RELATED TO THE HEPATITIS B ANTIGEN. *(E.)*

Iwarson, S.; Lundin, P.; Hermodsson, S. (Dept. Infect. Dis., Univ. Goteborg, Sweden). *J. Clin. Pathol.* 25(10):850-855, 1972.

A group of 165 hepatitis cases were classified into hepatitis A and B by a serological reaction which indicates quantitative differences in the liver histology of infectious hepatitis or hepatitis A (HA) and serum hepatitis or hepatitis B (HB). Thus HB was associated with more prominent parenchymal cell damage and Kupffer cell reaction, while intrahepatic cholestasis was found in a significantly higher frequency in cases presumed to represent HA. The presence of intrahepatic cholestasis was associated with higher levels of serum bilirubin, but otherwise no correlation was found between liver morphology and biochemical liver tests. The patients included 55 young i.v. amphetamine addicts with HB. No appreciable histological differences were found between addicts and other patients with hepatitis B.

4730 THE LOCALIZATION OF THE AUSTRALIA ANTIGEN IN THE LIVER BY IMMUNOFLUORESCENCE. *(E.)*

Akeyama, T.; Kamada, T.; Koizumi, T.; Abe, H. (Osaka Univ. Med. Sch., Japan). *J. Clin. Pathol.* 25(12):1071-1074, 1972.

A study has been made of the localization of Australia antigen in the liver cells of patients with hepatic disease by the fluorescent antibody technique (direct method). Liver specimens were taken from 2 patients with cirrhosis; and liver biopsy specimens were obtained from 2 Australia antigen carriers and 1 patient with subacute hepatitis. The blood from 5 chronic hepatitis patients in whom Australia antigen was not detectable served as a control. Specific fluorescence was observed mainly in the cytoplasm of liver cells. There were 2 distribution patterns of fluorescent-positive cells, i.e. a diffuse fluorescence in the liver lobules and a spotty distribution of fluorescent-positive cells. No fluorescence was present in the nuclei even when tested immediately after biopsy.

4731 DEVELOPMENT AND DISTRIBUTION OF HEMAGGLUTINATING ANTIBODY AGAINST THE HEPATITIS B ANTIGEN IN INSTITUTIONALIZED POPULATIONS. *(E.)* Szmuness, W.; Prince, A. M.; Etling, G. F.; Pick, R. (New York Blood Ctr., N.Y.). *J. Infect. Dis.* 126(5):498-506, 1972.

Blood from 1,098 patients and employees at 2 institutions for the mentally retarded was tested by the passive hemagglutination assay for the presence of HB antibody against the antigen of hepatitis B. The test was highly specific and sensitive. Of 52 patients newly admitted to 1 institution 26 developed either HB antigen or antibody during an 18-30-month follow-up period. None of these 26 developed overt hepatitis; this indicates a ratio of infection to overt hepatitis of >26:1 in this population. HB antibody, which tended to persist for long periods, was detected in 43-52% of all patients and in 20% of employees tested. The prevalence of HB antibody, in contrast to that of HB antigen, was consistently lower among the 330 mongols than among nonmongols, suggesting an immunologic deficiency in patients with mongolism. The prevalence of HB antibody was closely related to the duration of institutionalization. Other variables associated with prevalence or persistence of HB antigen appeared unrelated to the development and distribution of HB antibody. This indicates that, in hyperendemic conditions, all patients are equally exposed and equally susceptible to type B viral hepatitis but are not equally prone to develop the chronic carrier state.

4732 DISTRIBUTION OF HEPATITIS B ANTIGENIC DETERMINANTS IN DIFFERENT FORMS OF VIRAL HEPATITIS. *(E.)* Gordon, I.; Berberian, M.; Stevenson, D.; Redeker, A. G. (Univ. Southern Calif. Med. Sch., Los Angeles). *J. Infect. Dis.* 126(6):569-573, 1972.

The distribution of the *a*, *d*, and *y* antigenic determinants of hepatitis B (HB) antigen was established among 114 patients (72 with acute hepatitis and transient antigenemia and 42 with antigenemia lasting for a year or longer). Of the latter, 19 were asymptomatic with persistent hepatitis manifested by elevations of serum transaminase and inflammation and necrosis in liver biopsies. The remaining 23 had chronic active viral hepatitis with cirrhosis confirmed by liver biopsy. Among these were 5 patients with superimposed hepatoma. There was no correlation between a given form of hepatitis and the occurrence of a given antigenic determinant. Serial specimens from the same patient always yielded HB antigen of the same subtype. The data support the concept that the *a* antigenic determinant has group specificity, that *d* and *y* are mutually exclusive, and that *d* and *y* might not be directly associated with either the virulence or the chronicity of infection.

4733 RESUSCITATION OF A PATIENT IN STAGE IV HEPATIC COMA USING TOTAL BODY WASHOUT. *(E.)* Klebanoff, G.; Armstrong, R. G.; Cline, R. E.; Powell, J. R.; Bedingfield, J. R. (Wilford Hall USAF Med. Ctr., Lackland AFB, Tex.). *J. Surg. Res.* 13(4):159-165, 1972.

A 20-yr-old man presented with mild hepatic tenderness and hepatomegaly. During hospitalization his SGOT value rose to 4800, SGPT to 3600, and LDH to 800. Total bilirubin increased to 10.7 mg/100 ml. Despite neomycin and sorbitol therapy, prednisolone (30/mg/day), and restricted protein intake, his condition deteriorated and he developed Stage IV coma. The prednisolone dose was increased to 60 mg, and L-dopa (50 mg/kg) was given via nasogastric tube. No effects were noted after 2 trials. Total body washout was attempted. At 10 hr postoperation the patient was in stage III coma and 30 mg/kg L-dopa was administered. This resulted in rapid clearing of sensorium, normalization of cardiovascular and cerebral electrical activity, and a very dramatic recovery of liver function. If a patient in stage IV coma has not responded to L-dopa after bowel sterilization, sorbitol administration, and protein restriction, total body washout should be instituted.

4734 CONTROLLED TRIAL OF EXCHANGE-TRANSFUSION THERAPY IN FULMINANT HEPATITIS. *(E.)* Redeker, A. G.; Yamahiro, H. S. (Univ. Southern California Sch. Med., Los Angeles). *Lancet* (7793):3-6, 1973.

A controlled trial of exchange transfusion therapy for fulminant hepatic failure was undertaken in a group of 28 patients, aged 16-67 yr. Of these 28, 15 were randomly selected for exchange transfusion but therapy was only carried out in 8. The survival of patients with fulminant hepatitis and stage IV coma who were randomly selected to receive whole-blood exchange transfusion was not increased when compared to those patients who were not exchanged. The majority of the patients were young adults, and the two treatment groups appeared comparable in terms of age, hepatic function, renal function, and depth of coma. The mean value for serum creatinine at time of selection was 1.4 mg/100 ml for exchange patients and 2.0 mg/100 ml for non-exchange patients. The 8 patients who had exchange transfusions all died. Of the 13 patients who did not have exchange transfusions, 4 survived.

4735 GRANULOMATOUS HEPATITIS ASSOCIATED WITH ACUTE CYTOMEGALOVIRUS INFECTION. *(E.)*

Reller, L. B. (Univ. Washington Sch. Med., Seattle). *Lancet* (7793):20-22, 1973.

A case report is presented for a previously healthy 30-yr-old woman who had well-defined granulomas in a liver biopsy specimen obtained during acute cytomegalovirus infection. The diagnosis was confirmed by isolation of the virus and by increases in complement fixation and IgM and IgG indirect fluorescent-antibody titers. Most other known causes of hepatic granulomas were excluded. Acquired cytomegalovirus infection should be included in the differential diagnosis of granulomatous hepatitis.

4736 HEPATITIS-B ANTIGEN AND SAFETY IN PATHOLOGY LABORATORIES. *(E.)*

Watson, D.; Langley, D. J.; Chrystie, I. L.; Islam, M. N.; Bertrand, J.; Banatvala, J. E. (St. Thomas' Hosp., London, England). *Lancet* (7810):985-988, 1973.

An Australia-antigen screening survey was made on 99 commercial blood products used in clinical chemistry and hematology laboratories. Of 48 of the lyophilized human sera used for quality control and distributed by 1 European and 8 American companies, 35 (72%) contained the hepatitis B antigen, one notable exception being 8 sera from Technicon Instruments Corporation which were all negative for hepatitis B antigen. Of 35 other human serum-derived products used for diagnostic and standardization purposes 13 (36%) were also positive for hepatitis B antigen. The methods recommended by a National Health Services advisory group for detecting and estimating hepatitis B antigen are too insensitive. Manufacturers and hospital laboratories must be made aware that batches of such products should be regarded as high-risk specimens until more satisfactory screening procedures can be generally adopted.

4737 DIFFERENTIAL DISTRIBUTION OF AUSTRALIA-ANTIGEN-ASSOCIATED PARTICLES IN PATIENTS WITH LIVER DISEASES AND NORMAL CARRIERS. *(E.)*

Nielsen, J. O.; Nielsen, M. H.; Elling, P. (Blegdam Hosp., Copenhagen, Denmark). *N. Engl. J. Med.* 288(10):484-487, 1973.

Electron microscopy of Australia antigen particles was carried out on 80 serum specimens from 42 patients with various liver diseases and from 6 "normal" carriers. Dane particles were found in the serum of 11 of 13 patients with persistent antigenemia and chronic hepatitis, but in only 7 of 24 patients with uncomplicated acute hepatitis and transient antigenemia. No Dane particles were found in the specimens of 6 healthy carriers. Of the 13 patients with chronic hepatitis and persistent antigenemia, 7 had chronic aggressive hepatitis, 5 had chronic persistent hepatitis, and 1 showed histologic changes indicative of transition to chronicity. An additional 5 patients with persistent Australia antigenemia and cirrhosis of the liver were studied. The ratio between the small spherical particles and the rod-shaped particles was on an average 18.4 in patients with uncomplicated acute hepatitis and 3.8 in those with persistent antigenemia and chronic hepatitis. In 8 patients serum samples were available from both the acute and the chronic phase of hepatitis, and, initially the particle pattern was similar to the pattern seen in patients with chronic hepatitis. Thus, electron microscopy of Australia antigen particles in serum may be of prognostic value in acute hepatitis.

4738 VIRAL HEPATITIS, TYPE B (MS-2-STRAIN): FURTHER OBSERVATIONS ON NATURAL HISTORY AND PREVENTION. *(E.)*

Krugman, S.; Giles, J. P. (New York Univ. Sch. Med., N.Y.). *N. Engl. J. Med.* 288(15):755-760, 1973.

Further observations of the natural history and prevention of viral hepatitis type B revealed that all 25 nonimmunized susceptible children who had a parenteral exposure to MS-2 serum had evidence of hepatitis B infection; 25 had hepatitis B antigen which appeared 27-70 days after exposure, and 24 had an abnormal SGOT which appeared 72-91 days after exposure. Of 15 children who received standard immune serum globulin after a parenteral exposure to MS-2 serum, 13 had detectable hepatitis B antigen which appeared 42-63 days after exposure, and 12 had an abnormal SGOT which appeared 57-112 days after exposure. Of 10 children who received hepatitis B immune serum globulin after a parenteral exposure to MS-2 serum, 4 had detectable hepatitis B antigen and abnormal SGOT; of 29 children who received 1-3 inoculations of heat-inactivated MS-2 serum before a parenteral exposure to unheated MS-2 serum, 12 had detectable hepatitis B antigen and abnormal SGOT. The use of these active and passive immunizing procedures was associated with a protective effect, a more attenuated hepatitis B infection, and a decreased chronic carrier rate of hepatitis B antigen. These results indicate it is possible to prepare an inactivated vaccine for the prevention of viral hepatitis, type B.

4739 PLASMA EXCHANGE IN TREATMENT OF PROFOUND HEPATIC COMA. *(E.)*

Cree, I. C.; Straus, E.; Berger, S.; Voges, P.; Scotti, P.; Atkins, P. (New York Med. Coll., N.Y.). *N.Y. State J. Med.* 73(4):569-576, 1973.

Profound hepatic coma was present in 5 patients (3 men and 2 women, aged 17-31 yr). Heroin had been injected i.v. in 3 cases, and intradermally in 1 case. The 5th patient had a history of i.m. injections given with a boiled needle for relief of a chest infection. All 5 patients experienced severe respiratory difficulties; 3 did not respond to pain. As soon as 1 hr after the start of plasma exchange, marked increases in responsiveness occurred in 4 of the 5 patients treated, and 3 patients were discharged 7,8, and 15 weeks after admission; 2 patients died. Plasma exchange corrected hypotension, oliguria, and absent pupil reflexes, but when convulsions were present, recovery did not occur. Autopsy revealed Laennec's cirrhosis with superimposed hepatitis and overwhelming hepatocellular failure as the cause of death in one case. The depth of coma in each of these patients left little doubt that recovery would not have occurred without the use of plasma exchange.

4740 ETIOLOGIC RELATIONSHIP OF MARMOSET-PROPAGATED CR326 HEPATITIS A VIRUS TO HEPATITIS IN MAN. *(E.)* Provost, P. J.; Ittensohn, O. L.; Villarejos, V. M.; Arguedas, J. A.; Hilleman, M. R. (Merck Inst. Ther. Res., West Point, Pa.). *Proc. Soc. Exp. Biol. Med.* 142(4):1257-1267, 1973.

CR326 virus exhibited physicochemical properties characteristic of human hepatitis A virus, *e.g.*, small size and heat, ether, and acid stability. Its stability to acid is consistent with infectivity of hepatitis A by the oral route. A serum neutralization test was carried out with CR326 virus in *S. mystax* marmosets. Tests of paired sera from 8 patients with hepatitis B were carried out including coded paired sera from 3 human subjects given MS-1 strain hepatitis A and 1 given MS-2 strain hepatitis B virus from human sources. All subjects with hepatitis A developed antibody that neutralized CR326 virus; there was no such antibody response in persons with hepatitis B. This clearly shows that CR326 is immunologically related to hepatitis A. All 3 samples of human immune globulin neutralized the CR326 agent. Neutralization was highly effective since marmosets given the neutralized virus remained susceptible to reinfection with the agent; in contrast, recovered animals that had been given non-neutralized virus were immune to reinfection.

4741 HEPATITIS WITH AUSTRALIA ANTIGENEMIA FOLLOWING RENAL TRANSPLANTATION. *(E.)* Aronoff, A.; Gault, M. H.; Huang, S. N.; Lal, S.; Wu, K. T.; Moinuddin, M. D.; Spence, L.; MacLean, L. D. (Queen Mary Veterans Hosp., Montreal, Canada). *Can. Med. Assoc. J.* 108:43-50, 1973.

4742 ISOLATION AND PURIFICATION OF HEPATITIS-ASSOCIATED ANTIGEN BY AFFINITY CHROMATOGRAPHY WITH BABOON ANTISERUM. *(E.)* Grabow, W. O. K.; Prozesky, O. W. (Natl. Inst. Water Res., South African Council Sci. Ind. Res., Pretoria). *J. Infect. Dis.* 127(2):183-186, 1973.

4743 LEVELS OF IgG, IgA and IgM IMMUNOGLOBULINS IN ACUTE VIRAL HEPATITIS. *(E.)* Kraj, M.; Ciesluk, S. (Inst. Hematol., Warsaw, Poland). *Arch. Immunol. Ther. Exp. (Warsz.)* 20(5):693-701, 1972.

4744 PROTEIN CALORIE MALNUTRITION AND INFECTION WITH HEPATITIS-ASSOCIATED ANTIGEN. *(E.)* Suskind, R. M.; Olson, L. C.; Olson, R. E. (Rockefeller Fdn., Bangkok, Thailand). *Pediatrics* 51(3):525-530, 1973.

4745 THE EPIDEMIOLOGY OF HEPATITIS B ANTIGEN IN A HIGH PREVALENCE AREA. *(E.)* Punyagupta, S.; Olson, L. C.; Harinasuta, U.; Akarawong, K.; Varawidhya, W. (Ramathibodi Fac. Med., Bangkok, Thailand). *Am. J. Epidemiol.* 97(5):349-354, 1973.

4746 HEPATITIS IN THE AUCKLAND DIALYSIS UNIT. *(E.)* Bowie, E. A.; Doak, P. B.; North, J. D. K. (Auckland Hosp., New Zealand). *N.Z. Med. J.* 77(489):75-80, 1973.

4747 HEPATITIS IN DIALYSIS CENTERS. *(Ger.)* Schimmelpfennig, W.; Precht, K. (Charite Hosp., Humboldt Univ., Berlin, Germany). *Dtsch. Gesundheitsw.* 27(34):1588-1593, 1972.

4748 NEW FACES OF VIRAL HEPATITIS. *(E.)* Gocke, D. J. (Columbia Univ. Coll. Physicians Surg., New York, N.Y.). *D.M.* 1:1-32, 1973.

4749 SERUM AUTOANTIBODIES AND IMMUNOGLOBULINS IN HEPATITIS-ASSOCIATED ANTIGEN (HAA)-POSITIVE AND-NEGATIVE LIVER DISEASE. *(E.)* Dudley, F. J.; O'Shea, M. J.; Ajdukiewicz, A.; Sherlock, S. (Roy. Free Hosp., London, England). *Gut* 14(5):360-364, 1973.

4750 SERUM HEPATITIS AT A HOME FOR THE AGED. *(E.)* Braconier, J. H.; Nordenfelt, E. (Univ. Lund, Sweden). *Scand. J. Infect. Dis.* 4(2):79-82, 1972.

4751 AUSTRALIA-ANTIGEN IN LINEN AND UNDERWEAR OF HEPATITIS PATIENTS. *(E.)* Tripatzis, I.; Horst, H.; Konstantinidis, I. (Med. Acad., Lubeck, Germany). *Zentralbl. Bakteriol.* [*Orig.*] 222(4):428-430, 1972.

4752 POSSIBLE TRANSMISSION OF SERUM (AUSTRALIA-ANTIGEN-POSITIVE) HEPATITIS VIA THE CONJUNCTIVA. *(E.)* Kew, M. C. (Johannesburg Gen. Hosp. Univ. Witwatersrand, South Africa). *Infect. Immun.* 7(5):823-824, 1973.

4753 ACUTE VIRUS HEPATITIS. *(E.)* Sherlock, S. (Roy. Free Hosp., London, England). *Practitioner* 210(1259):603-611, 1973.

See also, 4245, 4680, 4773.

LIVER AND BILIARY TRACT

Chronic Hepatitis

4754 DRUG-INDUCED ACTIVE CHRONIC HEPATITIS. *(E.)* Goldstein, G. B.; Lam, K. C.; Mistilis, S. P. (Roy. Prince Alfred Hosp., Camperdown, Australia). *Am. J. Dig. Dis.* 18(3): 177-184, 1973.

In an investigation of the etiology of 21 consecutive cases of active chronic hepatitis, 14 were considered to be drug-induced: 9 were associated with ingestion of laxatives containing oxyphenisatin and 5 followed ingestion of methyldopa. Clinically, biochemically, and histologically, drug-induced cases closely resembled cases of active chronic hepatitis of unknown etiology. However, of 9 cases associated with laxative ingestion, 8 had submassive necrosis diagnosed on liver biopsy and 1 died in fulminant hepatic failure. Drug-induced cases showed clinical and biochemical improvement after drug withdrawal, and 3 months later the improvement in liver function was greater than in cases of unknown etiology. One case associated with methyldopa and 1 with laxatives containing oxyphenisatin had severe exacerbations of hepatitis on re-exposure to the drug.

4755 FAMILIAL CLUSTERING OF ASYMPTOMATIC CARRIERS OF AUSTRALIA ANTIGEN AND PATIENTS WITH CHRONIC LIVER DISEASE OR PRIMARY LIVER CANCER. *(E.)* Ohbayashi, A.; Okochi, K.; Mayumi, M. (Osaka Med. Coll., Japan). *Gastroenterology* 62(4):618-625, 1972.

Sera from 54 persons belonging to 3 families with a clustering of chronic liver disease and primary liver cancer, were tested for Australia antigen (Au antigen) and the antibodies against Au antigen (anti-Au) by means of the immune adherence hemagglutination method. Siblings had highly positive results in thymol turbidity and zinc sulfate turbidity tests and elevated γ-globulins. Au antigen was positive in 14 (93%) of 15 of the affected members and their siblings and was also positive in 20 (83%) of the 24 children of female siblings. In contrast, Au antigen was negative in 7 of 8 children of the male siblings and was also negative in 6 spouses of the siblings so far tested. The one male sibling's child who was positive for Au antigen had a mother in whom anti-Au was detected. Anti-Au was detected only in 1 of the wives of the Au antigen-positive males. From these findings and from a review of familial cirrhosis in the Japanese literature, it is suggested that, in certain kindreds, Au antigen or an Au antigen-related infective agent is transmitted from mother to child, and is also responsible for the development of the carrier state, chronic hepatitis, cirrhosis, and possibly primary liver cancer.

4756 LIVER DISEASE AND CELL-MEDIATED IMMUNITY IN HEPATITIS-ASSOCIATED ANTIGEN (HAA) CARRIERS. *(E.)* Bolin, T. D.; Davis, A. E.; Liddelow, A. G. (Sch. Med., Univ. New South Wales, Sydney, Australia). *Gut* 14(5):365-368, 1973.

An increased incidence of hepatitis-associated antigen carriers was found in a prison population (1.3%) where 18 male carriers subjects gave informed consent to further study with liver function tests, liver biopsy, and testing of cell-mediated immunity with dinitrochlorobenzene skin sensitization. Liver function tests were normal in 10 subjects, mildly abnormal in 6 (SGPT<100 IU/liter), and abnormal in 2. Serum proteins were normal in all. Liver biopsy showed that 5 subjects had chronic aggressive hepatitis, 3 of whom had normal liver function tests. Persistent hepatitis was detected in 8 subjects, 3 with normal liver function tests. The remainder had acute hepatitis (1), evidence of residual hepatitis (1), or non-specific changes (2). Only 1 subject had normal histology. Drug addicts, who comprised 10 of these 18 carriers had more severe liver

ase than those who were not addicts. The hypo-
is that persistent liver disease is associated
impaired cell-mediated immunity was not con-
ed, for 9 of the 12 subjects with persistent or
nic aggressive hepatitis had a positive response
initrochlorobenzene skin sensitization, thus
ying normal cell-mediated immunity. The find-
suggest that in the presence of continuing
genemia liver biopsy is mandatory in order to
iose treatable liver disease. The liver biopsy
ld be repeated every 2 months in cases where
istent hepatitis is noted to determine whether
hepatitis has resolved or is progressing toward
nic aggressive hepatitis.

THE RELEVANCE OF BLOOD CLOTTING TESTS IN CHRONIC AGGRESSIVE HEPATITIS. *(E.)*

neri, S.; Gasbarrini, G. (Inst. Occupational
, Bologna, Italy). *Scand. J. Gastroenterol.*
ppl. 19):97-101, 1973.

mplete coagulation study was performed in 32
patients. The diagnosis was established by
of liver biopsy, BSP clearance, serum
rophoresis, and immunoelectrophoresis. Correla-
coefficients between clotting and nonclotting
eters were calculated. Factorial analysis of
nce was performed by comparing aggressiveness
nonaggressiveness and cirrhosis with noncirrho-
The results show that, besides Quick time,
easurement of the prothrombin complex by
of Normotest and the immunological quanti-
n of antithrombin III are very valuable tools
ver function. Recognition of aggressiveness
ssociated with coagulation changes suggesting
dency to intravascular coagulation, consump-
phenomena, and hyperfibrinolysis. It is sug-
d that the extent to which consumption pheno-
are common features in aggressive hepatitis,
degree, and consequently the indication for
ose heparin therapy, must be carefully con-
ed in future clinical studies on blood co-
tion and liver disease.

CONTROLLED TRIAL OF PREDNISONE AND AZATHIOPRINE IN ACTIVE CHRONIC HEPATITIS.

Murray-Lyon, I. M.; Stern, R. B.; Williams, R.
s Coll. Hosp., London, England). *Lancet*
:735-737, 1973.

le-blind prospective trial of prednisone
azathioprine was conducted in the treatment
patients with active chronic hepatitis over
period. Prednisone was employed in 22
azathioprine in 25. Maintenance dosages
mg, 3 times/day and 75 mg/day, resp. Results
that prednisone was superior at improving
function, preventing the development of eso-
l varices, and prolonging survival (at 2 yr,
al rate for the prednisone group was 95% and
e azathioprine group, 72%). However, side-
s with prednisone included facial mooning (11
ts), diabetes mellitus (3), and hypertension
One patient had to be removed from prednisone
y due to crush fractures of the thoracic vertebrae. Death occurred in 1 patient in the prednisone group due to liver failure. In the azathioprine group death was caused by hepatic failure (2), hepatoma (1), and bleeding varices (3).

4759 ALBUMIN AND IMMUNOGLOBULIN TURNOVER IN PATIENTS WITH CHRONIC ACTIVE LIVER DISEASE TREATED WITH PREDNISONE. *(E.)*

Westergaard, H.; Jarnum, S.; Ramsoe, K.; Ranek, L. (Rigshospital, Copenhagen, Denmark). *Scand. J. Gastroenterol.* 7(7):623-630, 1972.

Albumin and IgG turnover were studied before and during long-term prednisone therapy (about 0.2 mg/kg) in 12 patients (2 males and 10 females, aged 13-72 yr) with chronic active liver disease. Diagnoses, confirmed by liver biopsies, included cryptogenic cirrhosis (9), chronic aggressive hepatitis (2), and secondary biliary cirrhosis (1). Before treatment, serum albumin concentrations were decreased in 9 patients, and the rate of albumin synthesis was decreased in 6 and low normal in 4. All patients had increased serum IgG concentrations and increased IgG synthesis. The patients' conditions stabilized or improved in 8 cases and deteriorated in 4 during therapy. Improvement or stabilization was associated with increases in the mean serum albumin concentration and rate of albumin synthesis, while deterioration was accompanied by decreases in both of these parameters. During prednisone therapy, serum IgG concentrations and IgG synthesis decreased in 11 of these 12 patients; decreases were greatest in patients whose conditions stabilized or improved. During therapy significant negative correlations were found between serum albumin concentrations and IgG synthesis, between serum IgG concentrations and albumin synthesis, and between the fractional catabolic rate of albumin and that of IgG. No correlations were found between duration of treatment and changes in liver function tests or protein turnover data. These results indicate that in chronic liver disease corticosteroids probably inhibit antibody production and stimulate albumin synthesis by 2 separate mechanisms.

4760 SPLENECTOMY IN ACTIVE CHRONIC HEPATITIS.

(E.) Boye, N. P.; Nordoy, A.; Gjone, E. (Rikshospital, Oslo, Norway). *Scand. J. Gastroenterol.* 7(8):747-750, 1972.

Splenectomy was performed on 6 patients (2 males and 4 females, aged 15-54 yr) with 3-7-yr histories of active chronic hepatitis and hypersplenism. Azathioprine had been administered to 4, and prednisone to 5 patients before splenectomy. After splenectomy azathioprine was given to all 6 and prednisone to 5 patients. Follow-up examinations, performed an average of 21 months after surgery, showed an increase in WBC, platelets, and hemoglobin in all 6 patients. SGPT values had improved in 6, serum bilirubin in 5, albumin in 4, γ-globulin in 4, and alkaline phosphatase in 3 patients. Early complications of therapy were mild and included wound infection in 2 patients, one of whom also had symptoms of hepatic precoma with some electrolyte disturbances. Late complications, necessitating reduction or temporary discontinuation of immunosuppressants, included mumps with orchitis and meningitis (1); leukopenia (1); and hematemesis and melena with hepatic precoma (1). Because of clinical improvement, immunosuppressants were discontinued in 2 patients 4 and 24 months, resp. after splenectomy. Thus splenectomy was well-tolerated by all 6 patients. Immunosuppressants, which had to be discontinued or could not be instituted because of bone marrow suppression before splenectomy, were well tolerated after surgery. No information was obtained on whether splenectomy *per se* has any effect on immunological processes in the liver.

4761 CHRONIC ACTIVE HEPATITIS ASSOCIATED WITH EOSINOPHILIA AND COOMBS'-POSITIVE HEMOLYTIC ANEMIA. *(E.)* Panush, R. S.; Wilkinson, L. S.; Fagin, R. R. (Silas B. Hays Hosp., Fort Ord, Calif.). *Gastroenterology* 64(5):1015-1019, 1973.

4762 IMMUNOLOGICAL ASPECTS OF HEPATITIS AND CIRRHOSIS. *(E.)* Smith, M.; Williams, R. (King's Coll. Hosp. Med. Sch., London, England). *Practitioner* 210(1259):633-644, 1973.

See also, 4732, 4737, 4749.

LIVER AND BILIARY TRACT

Alcoholic Liver Disease

4763 KETOACIDOSIS ASSOCIATED WITH ALCOHOLISM IN NONDIABETIC SUBJECTS. *(E.)* Levy, L. J.; Duga, J.; Girgis, M.; Gordon, E. E. (New York Univ. Med. Ctr., N.Y.). *Ann. Intern. Med.* 78(2):213-219, 1973.

Six episodes of metabolic acidosis in 5 nondiabetic, chronically alcoholic patients have been documented. Patients included 2 females and 3 males, aged 37-69 yr, all with histories of chronic alcoholism of as long as 40 yr. The only concomitant acute illness was 1 case of pneumonia. In no case was there a family history of diabetes mellitus. Protracted vomiting and prolonged abstention from food were common features. The acidosis resulted from accumulation of β-hydroxybutyrate, acetoacetate, and lactate in the plasma. The acidotic state was promptly corrected with i.v. fluids containing glucose, NaCl, and modest amounts of $NaHCO_3$. Analysis of the plasma at admission showed low concentrations of insulin and extremely high free fatty acid levels and cortisol concentrations. It is postulated that increased ketone body synthesis in these patients is a direct consequence of enhanced release of free fatty acids from adipose tissue stores. Exaggerated lipolysis could be secondary to low levels of circulating insulin, to increased concentrations of plasma cortisol and growth hormone, or to the response of other lipolytic hormones.

4764 PLASMA TESTOSTERONE, ESTRADIOL, AND GONADOTROPHINS IN HEPATIC INSUFFICIENCY. *(E.)* Kent, J. R.; Scaramuzzi, R. J.; Lauwers, W.; Parlow, A. F.; Hill, M.; Penardi, R.; Hilliard, J. (Long Beach VA Hosp., Calif.). *Gastroenterology* 64(1):111-115, 1973.

The pituitary-gonadal axis was evaluated in 22 male patients (aged 39-67 yr) with histories of chronic alcoholism and hepatic insufficiency, by utilizing measurements of serum estradiol, testosterone, follicle-stimulating hormone, and luteinizing hormone. In these patients, only testosterone levels were significantly different from those obtained in normal men (3.9 ng/ml in patients versus 5.2 ng/ml in normal subjects). Levels of follicle-stimulating hormone and luteinizing hormone were normal even in patients with markedly low serum testosterone. In no patient with low serum testosterone was gonadotrophin elevated to levels expected in primary testicular failure. The pathophysiology of hypogonadism in this disease may be more complicated than previous studies have indicated.

4765 CARBOHYDRATE METABOLISM IN ALCOHOL-INDUCED FATTY LIVER. EVIDENCE FOR AN ABNORMAL INSULIN RESPONSE TO GLUCAGON IN ALCOHOLIC LIVER DISEASE. *(E.)* Rehfeld, J. F.; Juhl, E.; Hilden, M. (Bispebjerg Hosp., Copenhagen, Denmark). *Gastroenterology* 64(3):445-451, 1973.

An i.v. glucose tolerance test and an i.v. glucagon test were performed on 21 chronic alcoholics with fatty liver. The effect on insulin secretion and blood glucose concentrations was compared with their effect in 21 normal subjects and 21 other chronic alcoholics of the same age and weight, with alcoholic cirrhosis. The average glucose tolerance in patients with fatty liver was lower than normal; 48% had a diabetic glucose tolerance. The glucose tolerance in cirrhosis was significantly lower, and it was impaired in 86% of the patients with alcoholic cirrhosis. In both cirrhosis and fatty liver the insulin concentrations were above normal before and during the 2 tests. The insulin-glucose ratio was increased in patients with liver disease during glucagon stimulation, and there was no significant difference between the two types of liver disease. During glucose stimulation the insulin-glucose ratios were equal in liver patients and normal subjects. Thus, the carbohydrate metabolism in alcoholic fatty liver is impaired as in alcoholic cirrhosis, although to a lesser degree. The abnormal response to glucagon may be caused by an increased β-cell sensitivity in fasting chronic alcoholics.

4766 HYPERLIPOPROTEINEMIA IN ALCOHOLIC SUBJECTS. *(E.)* Sirtori, C. R.; Agradi, E.; Mariani, C. (Univ. Milan, Italy). *Pharmacol. Res. Commun.* 5(1):81-85, 1973.

4767 DISSEMINATED INTRAVASCULAR COAGULATION IN ACUTE ALCOHOLIC LIVER DISEASE. *(E.)* MacMahon, A. G. (Univ. Stellenbosch, Bellville, S. Africa). *S. Afr. Med. J.* 47(6):227-228, 1973.

4768 ALCOHOLIC KETOACIDOSIS. *(E.)* Edwards, W. M.; Hoyt, R. (Med. Coll. Virginia, Richmond). *South. Med. J.* 66(2):281-282, 1973.

See also, 3953, 4116, 4123, 4124, 4147, 4614, 4653.

LIVER AND BILIARY TRACT

Cirrhosis

4769 THE OCCURRENCE AND SIGNIFICANCE OF ABNORMAL BILE DUCT EPITHELIUM IN CIRRHOSIS. *(E.)* Poulsen, H.; Christoffersen, P.; Dietrichson, O.; Faber, V. (Kommunehospital, Copenhagen, Denmark). *Acta Pathol. Microbiol. Scand.* [*A*] 80(5):659-664, 1972.

Review of a biopsy series of 497 consecutive cases of cirrhosis revealed 31 (7%) with abnormal bile duct epithelium. These 31 included 27 women and 4 men, with an average age of 64 and 71 yr, resp. Most had both hypoalbuminemia (72) and hypergammaglobulinemia (86). Average serum bilirubin was 2.0 mg/100 ml, SGOT was 241 U/liter, and alkaline phosphatase was 172 U/liter. The onset of illness was acute, first appearing as clinical acute hepatitis, in 15 cases; insidious in 14; and unknown in 2. On the basis of morphological, clinical, biochemical and immunological findings, it is probable that this group of cryptogenic cirrhosis has developed from chronic aggressive hepatitis. In contrast to previous findings cirrhosis with abnormal bile duct epithelium did not, during this 27 month study, exhibit a course that differed from other cases of cirrhosis, as the death rate does not differ from that of a larger group of cirrhosis patients.

4770 ALPHA$_1$ ANTITRYPSIN DEFICIENCY IN ASSOCIATION WITH BOTH CIRRHOSIS AND CHRONIC OBSTRUCTIVE LUNG DISEASE IN TWO SIBS. *(E.)* Glasgow, J. F. T.; Lynch, M. J.; Hercz, A.; Levison, H.; Sass-Kortsak, A. (Queen's Univ. Belfast, Inst., Clin. Sci., Northern Ireland). *Am. J. Med.* 54(2):181-194, 1973.

The association of α_1-antitrypsin deficiency with chronic familial liver disease and the occurrence of associated lung disease has been studied in 3 sibs, each having α_1-antitrypsin deficiency. In 2 of the sibs both liver and lung disease developed whereas the third remained healthy. Two of the sibs of the proband (1 affected and the unaffected) were of protease inhibitor phenotype ZZ, the parents were of phenotype MZ. The proband died at age 11 yr of massive intraabdominal hemorrhage secondary to cirrhosis. She had panlobular emphysema of all lung lobes, and destruction of bronchiolar elastica was demonstrated. In the other affected sib, the disease seems to run a more benign course. Presently, at 12 yr of age, he has clinical but no laboratory evidence of cirrhosis and no clinical but laboratory evidence of lung involvement. Liver biopsy specimens from the 2 affected sibs at 3 and 4.5 months of age, resp., revealed a similar picture of incipient perilobular cirrhosis. Liver cells were swollen and, especially toward the peripheries of the lobules, contained many diastase-fast, periodic acid-Schiff-positive granules and hyaline masses. These were increased in number and size in the second liver biopsy specimen obtained from the girl at 6 yr of age, but their distribution and occurrence were less uniform at this age and at autopsy.

4771 ALPHA-$_1$ ANTITRYPSIN DEFICIENCY, EMPHYSEMA, AND CIRRHOSIS IN AN ADULT.

(E.) Cohen, K. L.; Rubin, P. E.; Echevarria, R. A.; Sharp, H. L.; Teague, P. O. (J. Hillis Miller Health Ctr., Univ. Florida, Gainesville). *Ann. Intern. Med.* 78(2): 227-232, 1973.

The liver from a 46-yr-old white man with homozygous α_1-antitrypsin deficiency, emphysema, and cirrhosis was studied with fluorescent antibody specific for α_1-antitrypsin. The morphological findings from electron microscopy, fluorescent staining, and staining with periodic acid-Schiff reagent were similar to those found in the livers from children with α_1-antitrypsin deficiency and cirrhosis with regard to accumulation of α_1-antitrypsin in the liver. The areas of greatest cellular damage contained the most α_1-antitrypsin. A deficiency of α_1-antitrypsin was associated with significant liver disease in this patient. More extensive evaluation of liver function and structure in adult patients deficient in α_1-antitrypsin is clearly indicated.

4772 CIRRHOSIS ASSOCIATED WITH PARTIAL DEFICIENCY OF ALPHA-1 ANTITRYPSIN IN AN ADULT.

(E.) Campra, J. L.; Craig, J. R.; Peters, R. L.; Reynolds, T. B. (Univ. Southern California Sch. Med., Los Angeles). *Ann. Intern. Med.* 78(2):233-238, 1973.

A 63-yr-old woman had a 7-yr history of diabetes mellitis and had been taking oral antidiabetics. At age 58, examination revealed questionable esophageal varices, gastric polyps, and gallstones. At age 63 she developed ascites that led to a diagnosis of cryptogenic cirrhosis. Eosinophilic cytoplasmic inclusions were found in hepatocytes on examination of liver biopsy specimens and were shown by immunofluorescent staining to be deposits of α_1-antitrypsin. She had a partial deficiency of serum α_1-antitrypsin, with a SZ phenotype for the protease inhibitor system. Severe, homozygous α_1-antitrypsin deficiency is known to be associated with juvenile cirrhosis. It is proposed that a partial deficiency may be related to liver disease in adults.

4773 HISTOLOGICAL APPEARANCES IN FULMINANT HEPATIC FAILURE WITH REFERENCE TO AETIOLOGY, TIME OF SURVIVAL AND ROLE OF IMMUNOLOGICAL PROCESSES.

(E.) Goertz, J.; Williams, R. (King's Coll. Hosp., London, England). *Digestion* 8(1): 68-79, 1973.

Histories of 18 patients (aged 18-68 yr) dying of fulminant hepatic failure revealed the causes of disease to be toxic responses to halothane (3) or acetaminophen (3) or viral hepatitis (12), although only 2 had a contact history. Analysis of the microscopic appearance of the liver showed distinct differences according to likely cause and duration of survival. The weight of the liver was reduced, particularly in patients living longer than 10 days. A wrinkled capsule and loss of the lobular pattern correlated with liver shrinkage. Single-cell eosinophilic necrosis was found in almost all cases where liver cells survived. In all but 2 cases, areas of hepatocytes had disappeared and reticulin fibers, histiocytes, and mononuclear cells had replaced them. Histiocytes containing lipofuscin and sometimes iron pigments were commonly seen, with greater frequency during the first 10 days, particularly in cases of toxic damage. A significant proportion of the cells comprising the mononuclear cell infiltrate were demonstrated to be pyroninophilic. The incidence of cells with distinct pyroninophilic rims around the nucleus varied from 1 to 80%. Such cells were present more frequently in those with presumed viral hepatitis, although they did decrease with increasing survival time, than in those with toxic liver damage. This constitutes further evidence that immunological processes may play some part in the pathogenesis of the hepatic necrosis. Mitotic figures were observed only in those dying early in the disease. Evidence of hyperplasia of surviving cells and nodule formation in patients surviving more than 10 days spurs the hope that, if life can be supported long enough, compensatory hyperplasia of the liver will occur.

4774 CRITERIA FOR ASSESSMENT OF FUNCTIONAL IMPAIRMENT IN PATIENTS WITH CIRRHOSIS OF THE LIVER.

(E.) Bircher, J.; Blankart, R.; Halpern, A.; Hacki, W.; Laissue, J.; Preisig, R. (Dept. Clin. Pharmacol., Univ. Bern, Switzerland). *Eur. J. Clin. Invest.* 3(1):72-85, 1973.

In order to find quantitative criteria to assess the severity of the functional impairment in this disease 47 patients, aged 23-92 yr, with cirrhosis of the liver and 58 normal subjects were studied. The etiology of the cirrhosis was alcoholic in 28, cryptogenic in 17, and hemochromatic in 2. The special investigations included hepatic hemodynamics, partial functions, and liver volume, which was measured in frontal and right lateral scans. In contrast to normal subjects, liver volumes in cirrhosis were not correlated significantly with the body weight, with the galactose elimination capacity, or with the BSP transport maximum. Large livers, however, were associated with corresponding increases in splanchnic oxygen uptake even though hepatic blood flow estimated with the indocyanine green infusion and extraction technique appeared to vary independently. It is suggested that patients with cirrhosis can be further characterized on the basis of liver volume. In contrast to small livers, oxygen uptake and functional capacity were dissociated in hepatomegaly. Thus, with existing methods the severity of functional impairment in cirrhosis may be quantitatively investigated.

4775 BILE ACID METABOLISM IN PATIENTS WITH CIRRHOSIS. II. CHOLIC AND CHENODEOXYCHOLIC ACID METABOLISM.

(E.) Vlahcevic, Z. R.; Juttijudat

P.; Bell, Jr., C. C.; Swell, L. (VA Hosp., Richmond, Va.). *Gastroenterology* 62(6):1174-1181, 1972.

After administration of labeled bile acids (^{14}C-cholic and ^{14}C-chenodeoxycholic acids), primary bile acid kinetics and pool sizes were determined in 12 men, aged 34-67 yr, with alcoholic cirrhosis and in 10 patients without liver disease. Patients with cirrhosis had total bile acid and cholic acid pools about 1/2 those of the patients without liver disease. Little deoxycholic acid was present in the bile of cirrhotics, but the chenodeoxycholic acid pool was normal. Total daily synthesis of bile acids in cirrhotics was 40% that of the controls. In patients with cirrhosis the daily synthesis of cholic acid was about 1/4 that of the controls, whereas chenodeoxycholic acid synthesis was reduced by only 30%. The fractional turnover rate of cholic acid was reduced by 50% in cirrhotics, but the turnover rate of chenodeoxycholic acid was similar in cirrhotics and controls. As a result of changes in the fractional turnover rate of the primary bile acids, chenodeoxycholic acid turned over more rapidly than cholic acid in cirrhotics. Changes in the conversion of cholic to deoxycholic acid could account for the decreased cholic acid turnover in patients with cirrhosis. These findings suggest that the conversion of cholesterol to cholic acid is impaired in cirrhosis, possibly because of a deficiency in the enzyme system which converts the dihydroxy intermediate to the trihydroxy precursor of cholic acid.

4776 BILE ACID METABOLISM IN CIRRHOSIS. III. BILIARY LIPID SECRETION IN PATIENTS WITH CIRRHOSIS AND ITS RELEVANCE TO GALLSTONE FORMATION.

(E.) Vlahcevic, Z. R.; Yoshida, T.; Juttijudata, P.; Bell, Jr., C. C., Swell, L. (VA Hosp., Richmond, Va.). *Gastroenterology* 64(2):298-303, 1973.

Biliary lipid secretion and bile acid pools were determined in 10 patients without and 13 patients with cirrhosis. Patients with cirrhosis had a 46% decrease in the total bile acid pool. This alteration in the bile acid pool was associated with a 30% decrease in phospholipid secretion and a 66% decrease in biliary cholesterol secretion. The concentration of the biliary lipids in duodenal bile paralleled changes in biliary lipid secretion. The ratio of the cholesterol-solubilizing agents (bile salts + phospholipid) to cholesterol was 17.7 in patients with cirrhosis compared with 11.9 in non-cirrhotic patients. A triangular phase diagram plot of the biliary lipid composition data indicated that the bile of patients with cirrhosis was entirely normal (no insoluble cholesterol) and had a greater cholesterol holding capacity than the bile of control subjects. These findings indicate that cirrhotic patients are not predisposed to develop cholesterol gallstones. The reported high incidence of gallstones in cirrhotic patients may be related to an abnormality in bilirubin metabolism since a large proportion of the stones in these patients have been of the pigmented type.

4777 TREATMENT OF BLEEDING OESOPHAGEAL VARICES BY INFUSION OF VASOPRESSIN INTO THE SUPERIOR MESENTERIC ARTERY.

(E.) Murray-Lyon, I. M.; Pugh, R. N. H.; Nunnerley, H. B.; Laws, J. W.; Dawson, J. L.; Williams, R. (King's Coll. Hosp., London, England). *Gut* 14(1):59-63, 1973.

Attempts to treat bleeding esophageal varices were made in 18 patients with cirrhosis and 1 with an extrahepatic portal block by infusing 0.2-0.8 U/ml/min vasopressin into the superior mesenteric artery. Evidence of liver failure in these patients included ascites (14), encephalopathy (13), serum bilirubin of more than 2 mg/100 ml (12), and prothrombin tines of more than 3 sec (12). These attempts failed in 1 patient with extremely tortuous blood vessels and in 1 in whom the hepatic artery originated from the superior mesenteric artery which made selective infusion impossible. Bleeding was completely controlled in only 2 of 10 cases in which intraarterial infusion of vasopressin was used alone. Bleeding stopped for 2 or more days in 4 patients but recurred later even though infusion was being continued, and increasing the dose of vasopressin had no effect. A Sengstaken balloon tamponade was used in conjunction with intraarterial vasopressin infusion in 8 cases, but bleeding was controlled in only 2. Complications of infusion included large hematomas in the groin (6), dislodgement of the catheter (5), septicemia (3), occlusion of the catheter by a thrombus (2), thrombi found near the catheter (2), and severe femoral artery spasm (1). Only 6 of the 17 patients treated by vasopressin infusion survived and were discharged from the hospital. These included 3 of 5 who underwent transthoracic transection of the esophagus and ligation of varices and 1 patient who had a mesenteric-caval shunt operation performed. Of the 12 patients dying in the hospital, the causes of death were hemorrhage (8), liver failure (1), bacterial endocarditis (1), pneumococcal meningitis (1), and an unexplained cardiac arrest (1). Because of the large number of serious complications and the poor results obtained, this method is not recommended for the treatment of bleeding esophageal varices.

4778 LYMPHOCYTE TRANSFORMATION IN RESPONSE TO PHYTOHAEMAGGLUTININ IN PRIMARY BILIARY CIRRHOSIS: THE SEARCH FOR A PLASMA INHIBITORY FACTOR.

(E.) Fox, R. A.; Dudley, F. J.; Samuels, M.; Milligan, J.; Sherlock, S. (Roy. Free Hosp., London, England). *Gut* 14(2):89-93, 1973.

A study was made of the importance of plasma inhibitory factors in producing the impaired phytohemagglutinin (PHA)-induced lymphocyte transformation in patients with primary biliary cirrhosis. Normal subjects and 12 patients (2 male, 10 female) with primary biliary cirrhosis were studied. The lymphocytes from each subject were cultured in the presence of autologous plasma and also in the presence of homologous plasma from a normal subject or from a patient with primary biliary cirrhosis. Of the 12 patients, 5 had impaired lymphocyte transformation with counts below 50% of the lower limit of normal. No constant effect was produced by culturing normal lymphocytes in normal homologous instead of autologous, plasma. The results confirm that a portion of patients with primary biliary cirrhosis are anergic and that the impaired lymphocyte transformation to PHA *in vitro* can be partially accounted for by inhibitory factors in the plasma. However, these factors are unlikely to account completely for impaired transformation; it is probable that there are also abnormalities of the T lymphocytes themselves.

4779 SKELETAL MUSCLE BLOOD FLOW AND NEUROVASCULAR REACTIVITY IN LIVER DISEASE.

(E.) Lunzer, M.; Newman, S. P.; Sherlock, S. (Roy. Free Hosp., London, England). *Gut* 14(5):354-359, 1973.

There was no significant difference in forearm muscle blood flow, measured by the clearance of ^{133}Xe when 38 patients with liver disease were compared with 38 normal subjects. The patients with chronic liver disease had cryptogenic cirrhosis (14), chronic active hepatitis and cirrhosis (6), primary biliary cirrhosis (5), alcoholic cirrhosis (3), alcoholic hepatitis (2), subacute hepatitis (2), chronic intrahepatic cholestasis (2), fatty liver of pregnancy (1), chronic persistent hepatitis (1), halothane hepatitis (1), and viral hepatitis (1). Patients with a clinically hyperdynamic circulation, finger clubbing, and previous portocaval anastomoses were included in the study. The changes in forearm skeletal muscle blood flow and pulse rate caused by a head-up tilt of 70 degrees were measured in 15 patients with chronic liver disease and 15 age-matched controls. Head-up tilting resulted in significantly less peripheral vasoconstriction and tachycardia in the group with liver disease than in the control group. Since forearm muscle blood flow was normal in liver disease patients the peripheral vasodilatation may be entirely cutaneous in origin. These results suggest an impairment of baroreceptor-mediated sympathetic reactivity in liver disease. Such a defect might explain the relative rarity of hypertension in cirrhosis and may also contribute to the development of hypotension in cases of severe hepatic failure. It has been suggested that false adrenergic neurochemical transmitters accumulate and replace the physiological transmitters, norepinephrine and dopamine, in the nerve endings. Subsequent stimulation releases less active transmitters, resulting in lessened responses of the effector organ. Since noradrenergic transmission is required for sympathetic vasoconstriction, such an hypothesis could explain a defect in this reflex in liver disease.

4780 SERUM PROTEIN LEVELS IN PRIMARY BILIARY CIRRHOSIS.

(E.) MacSween, R. N. M.; Horne, C. H. W.; Moffat, A. J.; Hughes, H. M. (Western Infirm., Glasgow, Scotland). *J. Clin. Pathol.* 25(9):789-792, 1972.

Serum levels of albumin, transferrin, α_2-macroglobuli β_1C/β_1A, IgA, IgG, and IgM have been determined in 73 patients (67 women and 6 men, aged 41-79 yr) with primary biliary cirrhosis and in age- and sex-matched controls. A highly significant fall (28%) in albumin was demonstrated, and there were highly significant increases in α_2-macroglobulin (16%), IgM (174%), IgG (58%), and IgA (32%) levels. Transferrin and β_1C/β_1A levels were unchanged. No significant correlations were found between the titer of antimitochondrial antibody, the duration of symptoms, and any of the serum proteins estimated. A highly significant positive correlation was found between serum albumin and transferrin levels in both patient and control groups.

4781 FALSE-POSITIVE AUSTRALIA-ANTIGEN PARTICLES IN PRIMARY BILIARY CIRRHOSIS.

(E.) Sama, S.; Benz, W.; Aach, R.; Hacker, E.; Kaplan, M. (Tufts-New England Med. Ctr., Boston, Mass.). *Lancet* (7793):14-17, 1973.

Coded sera from 61 patients were tested for hepatitis B antigen (HB Ag) by electron microscopy and radioimmunoassay. The patients had primary biliary cirrhosis (24), HB Ag-positive hepatitis (10); infectious hepatitis (3); drug hepatitis (4); bile duct obstruction, Laennec's cirrhosis, and other disorders not associated with HB (10); familial hyperlipidemia (2); and hemophilia (4). Sera from 4 normal subjects were also included. Particles, morphologically indistinguishable from HB Ag, were observed in 40 sera, including 23 which were negative for HB Ag by radioimmunoassay Assuming that radioimmunoassay is both a sensitive and reliable method for detecting HB Ag, there were 23 false positives and 17 true positives by electron microscopy. Of 24 patients with primary biliary cirrhosis, 5 were positive for HB Ag by both methods. There were 8 false positives by electron microscopy. It was concluded that there are particles in sedimented serum that are morphologically similar but unrelated to HB Ag. Therefore electron microscopy alone is not a reliable way to detect HB Ag in serum. There was no evidence to suggest that HB Ag is a cause of primary biliary cirrhosis.

4782 VARICEAL HEMORRHAGE, HEPATIC CIRRHOSIS, AND PORTACAVAL SHUNTS.

(E.) Turcotte, J. G.; Lambert, III, M. J. (Univ. Michigan Med. Ctr., Ann Arbor). *Surgery* 73(6):810-817, 1973.

Between 1959 and 1973, portacaval shunts were constructed in 189 patients (117 males and 72 females aged 4-81 yr) with hepatic cirrhosis who had experienced at least one variceal hemorrhage. Patients were classified as A, B, or C risk on the basis of Child's criteria of hepatic reserve. Life-table 5 yr survival rates were 51.8, 28.4, and 17.3 %, resp. Corresponding early mortality rates, including all deaths occurring within 3 months of operation, were 7.7, 25.9, and 53.1%, resp. Of the

189 shunts performed, 113 were end-to-side and 76 side-to-side. These were performed in 52 good-risk patients, 87 moderate-risk and 50 poor-risk patients. The series included 146 elective shunts and 43 urgent procedures. Neither the age of the patient, urgency of the shunt, or etiology of the cirrhosis was as important as preoperative hepatic reserve in determining prognosis. It was noted that, among patients with good hepatic function, those whose cirrhosis was of alcoholic origin seemed to have a better prognosis than those with nonalcoholic cirrhosis. The prognosis of patients who survive operation was more than 60% at 3 yr, regardless of risk class. When analyzing results, only patients with similar etiologies for their portal hypertension and with equivalent hepatic reserve should be compared. The outlook for patients with advanced cirrhosis is poor but more than half of patients who have good hepatic reserve or who survive for 3 months after operation will be alive 5 yr later. These results suggest that, except for cases of obviously terminal hepatic failure, portal decompression should not be withheld, even in patients classified as poor risk.

4783 THE "BUTTERFLY" SIGN IN PATIENTS WITH CHRONIC JAUNDICE AND PRURITIS. *(E.)* Reynolds, T. B. (Univ. Southern California Sch. Med., Los Angeles). *Ann. Intern. Med.* 78(4):545-546, 1973.

4784 EMERGENCY SPLENIC VEIN-RIGHT ATRIAL SHUNT FOR MASSIVE ESOPHAGEAL HEMORRHAGE WITH CIRRHOSIS OF LIVER AND INFERIOR VENA CAVA OCCLUSION: REPORT OF AN OPERATION AND FOLLOW-UP. *(E.)* Luttwak, E. M.; Charuzi, I.; Licht, A.; Freund, H.; Borman, J. B. (Hadassah Univ. Hosp., Jerusalem, Israel). *Ann. Surg.* 177(4):411-412, 1973.

4785 STUDIES IN EXPERIMENTAL CANINE CIRRHOSIS: HEMODYNAMIC ALTERATIONS WITH EMPHASIS ON DEGREE OF SPONTANEOUS PORTO-SYSTEMIC SHUNTING. *(E.)* Moritz, E.; Kreuzer, W.; Schenk, Jr., W. G. (Dept. Surg., State Univ. New York, Buffalo). *Ann. Surg.* 177(4):503-506, 1973.

4786 ASPECTS OF LIVER TRANSPLANTATION. *(E.)* Williams, R. (King's Coll. Hosp., London, England). *J. R. Coll. Surg. Edinb.* 17(3):148-154, 1972.

4787 COMPLICATIONS OF PORTACAVAL ANASTOMOSIS. *(E.)* Conn, H. O. (Yale Univ. Sch. Med. New Haven, Conn.). *Am. J. Gastroenterol.* 59(3): 207-220, 1973.

4788 TESTOSTERONE PROPIONATE IN CIRRHOSIS OF THE LIVER. *(E.)* Islam, N.; Islam, A. (Inst. Postgrad. Med. Res., Dacca, Bangla Desh). *Br. J. Clin. Pract.* 27(4):125-128, 1973.

4789 CHOLESTEROL TURNOVER IN PATIENTS WITH CHRONIC LIVER DISEASE. *(E.)* Sandhofer, F.; Bolzano, K.; Sailer, S.; Braunsteiner, H. (Univ. Innsbruck, Austria). *Eur. J. Clin. Invest.* 3(1):10-15, 1973.

4790 RADIOLOGICAL DEMONSTRATION OF PATHOLOGICAL LYMPH DYNAMICS IN THE LIVER. *(Ger.)* Deimer, E.; Wenzl, M.; Wolf, G. (Inst. Radiol. Diagn., Univ. Vienna, Austria). *Fortschr. Geb. Roentgenstr. Nuklearmed.* 118(3):245-254, 1973.

4791 SERUM ZINC ESTIMATION IN HEPATIC DISORDERS OF INFANCY AND CHILDHOOD. *(E.)* Singh, S. D.; Vijayvargiya, R.; Dabke, A. T.; Khan, M. A.; Chhaparwal, B. C.; Mathur, P. S. (M.G.M. Med. Coll., Indore, India). *Indian Pediatr.* 9(10): 593-598, 1973.

4792 SIMULTANEOUS LIVER HEMOPERFUSION AND HEMODIALYSIS FOR TREATMENT OF HEPATIC COMA AND HEPATORENAL FAILURE. *(E.)* Abouna, G. M. (Med. Coll. Georgia, Augusta). *Surgery* 73(4): 541-549, 1973.

4793 THE DEVELOPMENT OF CHOLANGIOFIBROSIS AND HEPATOMAS IN GALACTOSAMINE INDUCED CIRRHOTIC RAT LIVERS. *(E.)* Lesch, R.; Bauer, C.; Reutter, W. (Pathol. Inst., Univ. Freiburg, Germany). *Virchows Arch. (Zellpathol.)* 12(3):285-289, 1973.

See also, 4235, 4242, 4263, 4759, 4764, 4864.

LIVER AND BILIARY TRACT

Gallbladder and Biliary Tract Diseases

4794 EFFECT OF TAUROCHOLIC ACID AND BSP ON CONJUGATION PATTERNS AND SUSPENSION STABILITY OF HUMAN AND RAT BILE. *(E.)* Gardner, B.; Masur, R.; Patti, J.; Ostrowitz, A. (Downstate Med. Ctr., State Univ. New York, Brooklyn, N.Y.). *Am. J. Surg.* 125(2):204-210, 1973.

Experiments were carried out to demonstrate conjugation patterns in rat bile during the formation and dissolution of lithocholic acid stones. The effect of diet on relative concentrations of cholesterol, lecithin, and bile salts were studied in 32 rats. An additional 28 rats were fed a low-protein diet supplemented with 1% lithocholic acid. After 4 weeks, 8 of the 28 received a 5% taurine supplement for 4 more weeks; 5 received the taurine supplement for 10 weeks. Stone dissolution was clearly related to increased excretion of taurine conjugates and reduction of the glycine to taurine conjugation ratio. In 12 postcholecystectomy patients feeding of 3.0 g/day of taurocholic acid increased bile salt excretion, shifted the glycine to taurine ratio toward taurine conjugation, and significantly increased choleresis. Large doses of BSP (5 mg/kg i.v.) increased bile stability as measured by the increase in the negative zeta potential of a standard particle in bile, but interfered with taurine-conjugated and total bile salt excretion. This prevented the anticipated additive effect between taurocholic acid and BSP. Administration of taurocholic acid p.o. is recommended as a means of increasing bile acid excretion and stabilizing the micelles.

4795 GALLSTONE DISEASE IN SWEDEN VERSUS JAPAN. CLINICAL AND ETIOLOGIC ASPECTS. *(E.)*
Van Der Linden, W.; Nakayama, F. (Dept. Surg., Centrallasarettet, Ostersund, Sweden). *Am. J. Surg.* 125(3):267-272, 1973.

A comparison was made of the clinical features of 100 consecutive patients operated on for cholelithiasis in a northern Swedish hospital and a similar group from a hospital in southern Japan. No difference was found in the sex ratio of the 2 series, but the age distribution of the 2 series differed markedly. After corrections were made for differences in the age distribution of the 2 populations at risk, the conclusion was drawn that cholelithiasis does not affect elderly people in Japan to the same extent as in Sweden. There were a few more cases of acalculous cholecystitis in Japan, but the difference was not significant. In the Swedish series nonvisualization of the gallbladder at cholecystography was found more often due partly to the fact that nonvisualization occurred most often in patients in the oldest age groups. Gallstones could be demonstrated far more often on a scout film of the abdomen in Japan due to differences in the composition of the stones; the stones contained more calcium bilirubinate and other calcium compounds in Japan. Choledocholithiasis occurred significantly more often in Japan than in Sweden, accounting for the higher frequency with which dilatation of the common duct and pathologic values for alkaline phosphatase were found in the Japanese series. Therefore, common duct exploration and reoperation for biliary duct stones were performed more often in Japan. Also probably related to this difference was the higher frequency of elevated values of urinary amylase. Serum cholesterol levels were higher in Sweden than in Japan.

4796 POST-TRAUMATIC CHOLECYSTITIS. *(E.)*
Golden, G. T.; Sears, II, H. F.; Wangensteen, S. L. (Univ. Virginia Med. Ctr., Charlottesville). *Am. Surg.* 39(5):275-278, 1973.

Acute cholecystitis developed in 5 patients following traumatic injury unrelated to the biliary tract: none had a prior history of biliary tract disease. Acutely inflamed gallbladders without stones were found in 3 patients at operation; gallstones were present in the 2 other patients. Focal areas of gangrene were found in the gallbladder in 2 patients. Difficulty in diagnosis was encountered in each, and in one patient surgery was not performed for 2 1/2 months following injury. This condition should be suspected in any patient with a severe injury or recent operation who develops fever, abdominal pain and distention. Results presented here do not confirm the suggested relation of post-traumatic cholecystitis to the resumption of oral feedings; to significant, preexisting hypotension; to generalized sepsis; or to the receipt of a large number of transfusions. Nonoperative management with hydration, intestinal decompression, and antibiotics would have been hazardous in this group of patients.

4797 EXPERIENCES WITH THE USE OF INTRACHOLEDOCHAL HEPARINIZED SALINE FOR THE TREATMENT OF RETAINED COMMON DUCT STONES. *(E.)* Gardner, B. (Downstate Med. Ctr., State Univ. New York, Brooklyn). *Ann. Surg.* 177(2):240-244, 1973.

Retained common duct stones in 5 patients disappeared after irrigation of the common duct through a T-tube with heparinized saline. It is thought that the heparin fragments the stone and then the smaller pieces pass spontaneously. Heparin may also have a direct effect on the sphincter at the lower end of the common bile duct with either reduction in postoperative inflammation or sphincter relaxation which allows stones to pass. This method has been employed in a total of 19 cases. Treatment was succesful in 15 and failed in 4.

4798 BILEMIA: AN UNUSUAL COMPLICATION OF BILE DUCTS STONES. *(E.)* Antebi, E.; Adar, R.; Zweig, A.; Barzilay, J.; Mozes, M. (Chaim Sheba Med. Ctr., Tel-Hashomer, Israel). *Ann. Surg.* 177(3):274-275, 1973.

Bilemia, due to the flow of bile into the circulation following the establishment of a non-traumatic "fistula" occurred in a 72-yr-old woman hospitalized with jaundice and severe pain in the right upper quadrant. Pain had been intermittent for 1 yr. Autopsy revealed a fistula between the left hepatic duct and portal vein resulting from a recent (a few hr before death) perforation caused by a small stone. An extensive, recent hematoma was present in the left lobe of the liver. The gallbladder contained many small stones. Two stones were impacted at the lower end of the common bile duct causing pressure in the biliary system to be higher

ıan pressure in the portal vein, thus forcing
lle into the circulation through the perforation.
bile pulmonary emboli were found. Shock
ıd ensuing death were the result of sudden
tastrophic flooding of the circulation with
le. It is unlikely that the bile was infected
nce the patient remained completely afebrile for
ıe 2 days before her death.

799 UPPER GASTROINTESTINAL BLEEDING ASSOCIATED WITH BILIARY DIVERSION AFTER HEPATIC
JURY. *(E.)* Bowen, J. C.; Fleming, W. H. (Walter
ed Army Inst. Res., Washington, D. C.). *Ann. Surg.*
7(4):402-405, 1973.

ıring a 9-month period, 81 consecutive hepatic in-
ıries were treated at the 24th Evacuation Hospital
Vietnam. Of these 81 cases, 94% had multiple
juries. These were caused by multiple fragment
unds (60%), high velocity missile injuries (21%),
d blunt trauma (19%). Seven (32%) of the 22 pa-
ents with external biliary drainage after hepa-
c injury developed upper gastrointestinal bleed-
g while bleeding occurred in only one (2%) of
e 54 patients without external biliary drainage.
ere is no clinical or experimental evidence to con-
rm that T-tube drainage of a normal common duct
wers intrahepatic pressures or reduces biliary ex-
avasation from a debrided and sutured liver. It is
stulated that biliary diversion may increase gas-
ic acid secretion, thereby increasing the suscep-
bility of the severely injured patient to stress
cer bleeding.

)0 CHOLELITHIASIS IN HYPERPARATHYROIDISM. A NEGLECTED MANIFESTATION. *(E.)* Selle,
G.; Altemeier, W. A.; Fullen, W. D.; Goldsmith,
E. (Univ. Cincinnati Med. Ctr., Ohio). *Arch.*
g. 105(2):369-374, 1972.

lelithiasis has been demonstrated in at least
(19) of a series of 75 patients (51 female,
male) with primary hyperparathyroidism and 88
athyroid adenomas. This contrasts sharply
h an incidence of cholelithiasis of 10%
the general population. Of the 75 patients with
erparathyroidism, 62 had solitary while 11 had
tiple adenomas. Parathyroid hyperplasia was
nd in 2 patients. Of the 19 patients with
ved cholelithiasis and primary hyperparathyroidism,
ere less than 30 yr old. In addition, at least
f the 19 patients with cholelithiasis had radi-
que gallstones in contrast to the general inci-
ce of 10% radiopaque calculi. The type of
lstones found in the 14 cholecystectomies performed
e mixed or pure cholesterol in 4; calcium
irubinate, 2; calcium bilirubinate and cholesterol,
calcium bilirubinate and combined, 1; and not
orded, 6. Other diseases associated with hyper-
athyroidism were renal calculi in 59% (44 patients),
tic ulcer in 27% (20 patients), bone disease in
(12 patients), mental disturbances in 12% (9
ients), and pancreatitis or ectopic calcification
only 4% (3 patients).

4801 ACUTE CHOLECYSTITIS AND JAUNDICE. *(E.)* Corlette, M. B.; Bismuth, H. (Cambridge Hosp., Mass.). *Arch. Surg.* 106(6):829-832, 1973.

Intraoperative cholangiomanometry was used to study 37 patients, aged 19-84 yr, with acute cholecystitis and jaundice. Reasonably certain causes of jaundice included: common duct stone (15 cases); invasive gallbladder and periampullary carcinoma (5); cholecystocholedochal fistula (1); stricture (1); sphincter stenosis (1); and medical causes (1). A stone had probably been passed in 6 other patients; 1 had hepatitis. Inflammatory factors were compared with a group of 36 nonjaundiced patients with acute cholecystitis. Cholangiomanometry showed no lesion and normal pressures in all controls except those with common duct stones. Perforation and extravesicular abscess formation, marked inflammation about the hepatic pedicle, large stones impacted in the gallbladder neck or cystic duct which was in contact with the hepatic duct, and tensely distended gallbladders were features occurring in both groups with about equal frequency.

4802 FIBRINOLYSIS IN CHOLESTATIC JAUNDICE. *(E.)* Jedrychowski, A.; Hillenbrand, P.; Ajdukiewicz, A. B.; Parbhoo, S. P.; Sherlock, S. (Roy. Free Hosp., London, England). *Br. Med. J.* 1(5854):640-642, 1973.

The fibrinolytic system was studied in primary biliary cirrhosis (16 patients, aged 35-66 yr) and common bile duct obstruction (10 patients, aged 28-62 yr, 9 of whom had carcinoma of the pancreas or bile ducts and 1 of whom had a stricture of the common bile duct). Plasma fibrinolysis (plasminogen activator activity) was decreased and fibrinogen increased in both groups of patients, particularly in those with common duct obstruction. These changes were related to the degree of cholestasis. Fibrinogen increase was also related to the levels of bilirubin, cholesterol, and alkaline phosphatase. Plasminogen activator activity was inversely related to serum triglyceride levels in patients with primary biliary cirrhosis. Urokinase inhibitors were decreased in both groups and antiplasmins increased in patients with common bile duct obstruction. Fibrin/fibrinogen degradation products were normal in primary biliary cirrhosis and moderately increased in common duct obstruction. None of these fibrinolytic indices were related to the degree of cholestasis. Fibrinolytic activity and fibrinogen returned almost to normal levels after palliative surgery in the 3 patients with common duct obstruction who were studied. The decreased plasma fibrinolysis and increased fibrinogen may be due to altered lipid metabolism in cholestatic jaundice. In patients undergoing surgery for common duct obstruction there may be an increased risk of thrombosis.

4803 REGULATION OF BILE SALT POOL SIZE IN MAN. *(E.)* Low-Beer, T. S.; Pomare, E. W.

(Bristol Roy. Infirm., England). *Br. Med. J.* (5862):338-340, 1973.

Kinetics of the enterohepatic circulation of bile salts was studied in 9 patients with celiac disease, 11 cholecystectomized patients, and 10 age- and sex-matched controls by labeling the bile salt pool with radioactive taurocholate, measuring the rate at which the specific radioactivity of the bile decreased, and calculating the taurocholate pool size, half-life, and daily synthesis. Despite significant differences in taurocholate pool size, taurocholate synthesis was normal in both patients with celiac disease and cholecystectomized patients. In celiac disease the half-life of taurocholate doubled, which is consistent with infrequent cycling in the enterohepatic circulation. The taurocholate pool was increased 2- to 3-fold, but the percentage of taurocholate in the total bile salt pool did not differ significantly from that in normal controls. For each patient a significant correlation was found when the taurocholate pool size was plotted against its half-life. In cholecystectomized patients, taurocholate pool size and half-life were each decreased 1/3 to 1/2 and were significantly correlated with one another. In these patients, the short half-life is due to normal excretion from a small pool circulating more frequently than normal. The only simple explanation of all these findings is that the bile salt pool size is regulated by the frequency of the enterohepatic circulation of the pool.

4804 ALTERATION OF BILE CANALICULAR ENZYMES IN CHOLESTASIS. A POSSIBLE CAUSE OF BILE SECRETORY FAILURE. *(E.)* Simon, F. R.; Arias, I. M. (Univ. Colorado Med. Ctr., Denver). *J. Clin. Invest.* 52(4):765-775, 1973.

The possibility that abnormalities in enzyme content, composition, and turnover of liver plasma membrane constituents are altered in cholestasis has been examined in male Sprague-Dawley rats. Severe and mild cholestasis were produced by 5 days of bile duct ligation and ethinyl estradiol administration (0.5 mg/100 g/day s.c. for 5 days), resp. Bile duct ligation, but not ethinyl estradiol, was associated with elevations of serum bilirubin and 5'-nucleotidase activity. However, basal bile flow was reduced by 30% and bilirubin transport maximum (T_m) by 50% after ethinyl estradiol. Liver plasma membrane fractions rich in canalicular membrane were prepared from groups of rats in each of 3 categories: normal, after bile duct ligation, or after ethinyl estradiol administration, and their respective controls. Electron microscopy and enzyme marker studies demonstrated plasma membrane fractions free of significant contamination. Plasma membrane fractions prepared from rats with both mild and severe cholestasis increased alkaline phosphatase activity and reduced 5'-nucleotidase and Mg^{2+}-ATPase activities. Co^{2+}-cytidine monophosphatase activity was unchanged. Kinetic analysis of 5'-nucleotidase and Mg^{2+}-ATPase activities in plasma membrane fractions demonstrated reduced V_{max} (but unaltered K_m). Reduced V_{max} was unrelated to addition *in vitro* of di- or trihydroxy bile salts or ethinyl estradiol, suggesting that reduced activities in cholestasis are due to decreased enzyme content. Cholestasis was not associated with changes in the synthesis or degradation rate of pulse-labeled plasma membrane proteins or alterations in the major protein bands separated on sodium dodecyl sulfate-polyacrylamide gel electrophoresis. Plasma membrane cholesterol, phospholipid, and neutral sugar content were unchanged but the sialic acid content increased significantly in both forms of cholestasis. Alterations in specific canalicular enzymes in two forms of cholestasis may be involved in the pathogenesis of bile secretory failure or may result from cholestasis.

4805 LECITHIN-CHOLESTEROL ACYLTRANSFERASE AND SERUM CHOLESTEROL ESTERIFICATION IN OBSTRUCTIVE JAUNDICE. *(E.)* Kepkay, D. L.; Poon, R.; Simon, J. B. (Dept. Med., Queen's Univ., Kingston, Canada). *J. Lab. Clin. Med.* 81(2):172-181, 1973.

Serum lecithin-cholesterol acyltransferase (LCAT) activity was studied in 8 patients with biliary obstruction and in 8 normal subjects. Cholesterol esterifying activity of serum was determined *in vitro* both by a radioisotopic LCAT assay and by a colorimetric method. Despite having an abnormally low ratio of esterified-to-free serum cholesterol, the patients had a higher mean serum LCAT activity than the normal subjects (44.5 as opposed to 31.0 μg cholesterol esterified/ml/hr, resp.). Similar results were obtained by colorimetry. Moreover, all 8 cholestatic sera stimulated the LCAT activity of normal sera, and in 7 of the 8 patients LCAT activity was lower when assayed with substrate prepared from normal serum instead of endogenous cholestatic serum. LCAT activity in the patients did not correlate with serum free cholesterol, cholesterol ester, or lecithin concentrations, nor with the percentage of total serum cholesterol present as esters. Thus, in contrast to parenchymal liver disease, the abnormally low ratio of esterified-to-free serum cholesterol in obstructive jaundice is not associated with decreased serum cholesterol esterifying activity. Indeed, cholestatic serum stimulates the LCAT reaction. These findings might reflect the presence of LP-X, a recently described lipoprotein unique to cholestasis.

4806 BILIARY LIPID SECRETION IN GALLSTONE PATIENTS. *(E.)* Northfield, T. C.; Hofmann, A. F. (Mayo Clin., Rochester, Minn.). *Lancet* (7806):747-748, 1973.

Using a duodenal perfusion technique, the hourly output of bile acids, phospholipid, and cholesterol was measured during three meals and an overnight fast in 7 Caucasians (3 male, 4 female; average age 55 yr) with radiolucent gallstones in a functioning gallbladder, and in 7 healthy controls without gallstones matched for age, sex, and weight. Before perfusion, the bile acid pool size was determined by isotope dilution. There was an inverse relation between the size and recycling rate of the bile acid pool, so that bile acid secretion rate remained constant over a wide range of pool sizes. The total daily output of all 3 biliary lipids was similar in gallstone patients and controls. Hourly measurements showed a linear relation between bile acid and cholesterol output, but a sigmoid relation between bile acid and phospholipid output. As a result, bile was consistently saturated or supersaturated with cholesterol at low bile-acid outputs. Secretion of this lithogenic bile occurred with equal frequency in gallstone patients and controls for a mean of 9 hr out of 24 hr. Lithogenic bile was secreted significantly more frequently by both groups during overnight fasting than during the daytime, and seems to be physiological.

4807 CARCINOMA OF THE PROXIMAL BILE DUCTS. *(E.)* Ross, A. P.; Braasch, J. W.; Warren, K. W. (Lahey Clin. Fdn., Boston, Mass.). *Surg. Gynecol. Obstet.* 136(6):923-928, 1973.

Case records of 103 patients (59 men and 44 women, aged 23-78 yr) with carcinoma of the proximal bile ducts were reviewed. Carcinoma appeared in the left hepatic duct in 3 patients, right hepatic duct in 4, bifurcation of the hepatic ducts in 46, common hepatic duct in 24, at the junction of cystic or common hepatic ducts in 15, and in the supraduodenal common bile duct in 8. In 3 patients the tumor involved all proximal bile ducts. Diseases associated with carcinoma or which were present shortly before its appearance included calculi in the gallbladder (31), ulcerative colitis (8), and tumor resection (5, 3 of which were for colon carcinomas). Jaundice was a presenting symptom in 93 cases. Pain, which was present in 50 cases, was usually dyspeptic. Pruritus, which appeared in the later stages, was the most distressing symptom for the patient and was present in 29 cases. Cholangitis was present in only 6 cases. The serum bilirubin level was over 15 mg/100 ml in more than half the cases. Almost invariably serum alkaline phosphatase rose significantly. When complete exploration of the bile duct was carried out, the major problem at operation was establishing a correct histologic diagnosis, as the tumor promotes a marked fibroblastic reaction that mimics either biliary stricture or benign sclerosing cholangitis. Tumor resection was possible in only 12 and bypass, in 19 cases. The 9 patients surviving 4 or more yr were in these groups. The majority of deaths was caused by hepatocellular failure secondary to recurrent cholangitis and prolonged biliary obstruction. Only 1 patient with a poorly differentiated tumor survived more than 39 months. An association was noted between carcinoma of the proximal bile ducts and chronic ulcerative colitis.

4808 EVIDENCE THAT A DIMINISHED BILE ACID POOL PRECEDES THE FORMATION OF CHOLESTEROL GALLSTONES IN MAN. *(E.)* Bell, Jr., C. C.; Vlahcevic, Z. R.; Prazich, J.; Swell, L. (VA Hosp., Richmond, Va.). *Surg. Gynecol. Obstet.* 136(6):961-965, 1973.

Bile acid pool size, kinetics, and biliary lipid composition were determined in American Indian patients (17 men and 24 women, aged 18-66 yr) with no symptoms of gallbladder disease and good gallbladder function. Cholesterol gallstones were demonstrated radiologically in 13 cases; 13 had bile saturated with cholesterol and no gallstones; and 18, normal bile and no gallstones. When compared to patients with normal bile, those with gallstones exhibited a greatly diminished total bile acid pool and an approximately 2-fold increase in the turnover of primary bile acids with no change in bile acid synthesis. Patients with lithogenic bile and no stones had the same bile acid kinetics and pool size as those with gallstones and abnormal bile. Patients in all 3 groups synthesized about 400 mg/day of bile acids. There was a significant decrease in phospholipid secretion in patients with abnormal bile. No significant difference was found between groups with gallstones and lithogenic bile. Cholesterol secretion did not differ between groups with normal and abnormal bile. These findings suggest that a diminished bile acid pool precedes the development of gallstones and could be a causative factor in the development of a lithogenic bile and eventual gallstone formation in man.

4809 AEROMONAS SEPTICEMIA FROM HEPATOBILIARY DISEASE. *(E.)* DeFronzo, R. A.; Murray, G. F.; Maddrey, W. C. (Johns Hopkins Hosp., Baltimore, Md.). *Am. J. Dig. Dis.* 18(4):323-331, 1973.

4810 THE CALCIUM PALMITATE GALL-STONE. *(E.)* Cowie, A. G. A.; Sutor, D. J.; Wooley, S. E.; Clark, C. G. (Univ. Coll. Hosp. Med. Sch., London, England). *Br. J. Surg.* 60(1):16-18, 1973.

4811 UNABSORBABLE SUTURE MATERIAL: A RARE CAUSE OF RECURRENT STONES IN THE COMMON BILE-DUCT. *(E.)* Mackie, D. B.; Haynes, S.; May, R. E. (Salisbury Gen. Infirm., England). *Br. J. Surg.* 60(1):23-24, 1973.

4812 GALLSTONES IN CHILDREN: CASE REPORT, DIAGNOSTIC CLUES AND RECENT VIEWS ON GALLSTONE FORMATION. *(E.)* Shrand, H.; Ackroyd, F. W. (Mt. Auburn Hosp., Cambridge, Mass.). *Clin. Pediatr.* 12(4):191-194, 1973.

4813 CHOLESTEROL AND BILE SALT STUDIES ON THE BILE OF PATIENTS WITH CHOLESTEROL GALLSTONES. *(E.)* Heller, F.; Bouchier, I. A. D. (Roy. Free Hosp., London, England). *Gut* 14(2):83-88, 1973.

4814 THE NATURE AND INCIDENCE OF GALLSTONES CONTAINING CALCIUM. *(E.)* Sutor, D. J.; Wooley, S. E. (Dept. Chem., Univ. Coll., London, England). *Gut* 14(3):215-220, 1973.

4815 CHOLEDOCHAL CYST: DIAGNOSIS BY ORAL CHOLECYSTOGRAPHY. *(E.)* Morello, D. C.; Blumenthal, B.; Kirkpatrick, J. A. (St. Christopher's Hosp. Children, Philadelphia, Pa.). *J. Pediatr. Surg.* 8(1):69-70, 1973.

4816 PARTICIPATION OF MICELLE AT CRYSTAL-SOLUTION INTERFACE IN RATE-DETERMINING STEP FOR CHOLESTEROL GALLSTONE DISSOLUTION IN UNSATURATED BILE MEDIA. *(E.)* Higuchi, W. I.; Surpuriya, V.; Prakongpan, S.; Young, F. (Coll. Pharm., Univ. Michigan, Ann Arbor). *J. Pharm. Sci.* 62(4):695-696, 1973.

4817 AN INTERNATIONAL STUDY ON GALLSTONE COMPOSITION. *(E.)* Bouchier, I. A. D. (Roy. Free Hosp., London, England). *J. R. Coll. Surg. Edinb.* 17(3):180-183, 1972.

4818 COMPLICATIONS OF ACUTE CHOLECYSTITIS AND CHOLELITHIASIS. *(Rus.)* Maliugina, T. A. (N. V. Sklifosovskii Inst. Emergency Med. Ther., Moscow, USSR). *Sovet. Med.* 35(7):93-97, 1972.

4819 DUPLICATION OF THE COMMON BILE DUCT. *(E.)* Casebolt, B. T. (no affil.). *Mo. Med.* 70(3):171-174, 1973.

4820 AGENESIS OF THE GALLBLADDER. IS PREOPERATIVE DIAGNOSIS POSSIBLE? *(E.)* Haughton, V.; Lewicki, A. W. (Harvard Med. Sch., Boston, Mass.). *Radiology* 106(2):305-306, 1973.

4821 CYSTIC DUCT REMNANT-DUODENAL FISTULA. *(E.)* Van Houten, F. X.; Lewicki, A. W. (Harvard Med. Sch., Boston, Mass.). *Radiology* 107 (1):81-82, 1973.

4822 CURRENT CONSIDERATIONS IN THE REPAIR OF BILE DUCT STRICTURES. *(E.)* Braasch, J. W. (Lahey Clin. Fdn., Boston, Mass.). *Surg. Clin. North Am.* 53(2):423-433, 1973.

4823 CONGENITAL ABSENCE OF THE GALLBLADDER. *(E.)* Lindskog, B. I. (Univ. Lund, Gen. Hosp., Malmo, Sweden). *Acta Chir. Scand.* 139(2):208-209, 1973.

4824 PRIMARY SCLEROSING CHOLANGITIS: CASE REPORT AND REVIEW OF THE LITERATURE. *(E.)* Brantigan, C. O.; Brantigan, O. C. (Med. Dept., Fleet Anti-Submarine Warfare Sch., San Diego, Calif.). *Am. Surg.* 39(4):191-198, 1973.

4825 LIVER INJURY IN CHOLELITHIASIS. *(E.)* Dooner, H.; Rojas, R.; Soto, G.; Puente, S.; Jara, R. (Hosp. San Borja, Santiago, Chile). *Am. Surg.* 39(4):234-237, 1973.

4826 CHOLECYSTITIS IN CHILDHOOD AND ADOLESCENCE. *(E.)* Sears, H. F.; Golden, G. T.; Horsley, III, J. S. (Univ. Virginia Med. Ctr., Charlottesville). *Arch. Surg.* 106(5):651-653, 1973.

4827 CYSTIC DILATATION OF THE INTRAHEPATIC BILE DUCTS. *(E.)* Rosenwarne, M. D. (North Gen. Hosp., Sheffield, England). *Br. J. Radiol.* 45(539):825-827, 1972.

4828 NEOPLASTIC STENOSIS OF THE COMMON BILE DUCT. *(It.)* Angrisani, G.; Molino, D. (2nd Clin. Gen. Surg. Surg. Ther., Univ. Naples, Italy). *Riforma Med.* 86(26):1007-1031, 1972.

4829 A 'CORRUGATED' EXTRAHEPATIC BILE-DUCT: A NEW CHOLANGIOGRAPHIC PICTURE. *(E.)* Dickson, G. H. (Worthington Hosp., Sussex, England). *Br. J. Surg.* 60(2):161-162, 1973.

4830 HAMARTOMA OF THE HEPATIC BILE DUCTS. *(E.)* Toledo-Pereyra, L. H.; Goodale, Jr., R. L.; Najarian, J. S.; Ward, P. (Univ. Minnesota Hosp., Minneapolis). *Minn. Med.* 56(1):20-22, 1973.

4831 CARCINOMA IN THE PORCELAIN GALLBLADDER. *(E* Berk, R. N.; Armbuster, T. G.; Saltzstein, S. L. (Sch. Med., Univ. California, San Diego). *Radiology* 106(1):29-31, 1973.

4832 SURGICAL TREATMENT OF BILE DUCT STRICTURES. *(E.)* Lindenauer, S. M. (Univ. Michigan Med. Ctr., Ann Arbor). *Surgery* 73(6):875-880, 1973.

4833 FIXED DEFECTS OF THE GALLBLADDER WALL AND ADENOMYOMATOSIS. *(E.)* Shapiro, R. (Hosp. St. Raphael, New Haven, Conn.). *Surg. Gynecol. Obste* 136(5):745-752, 1973.

See also, 4024, 4036, 4037, 4120, 4146, 4231, 4238, 4247, 4250, 4252, 4287, 4288, 4290, 4416, 4427, 4592, 4605, 4606, 4617, 4645, 4668, 4711, 4776, 4858.

4834 PROTRACTED DIARRHEA OF INFANCY TREATED BY INTRAVENOUS ALIMENTATION. I. CLINICAL STUDIES OF 16 INFANTS. *(E.)* Lloyd-Still, J. D.; Shwachman, H.; Filler, R. M. (Children's Med. Ctr., Boston, Mass.). *Am. J. Dis. Child.* 125(3):358-364, 1973.

Sixteen infants (9 boys and 7 girls, aged 10 days to 10 months) with protracted diarrhea and resultant nutritional failure were treated with i.v. alimentation for 20-98 days (mean, 43 days). All infants survived the immediate illness. A variety of enteropathogenic microorganisms were isolated from the stools of 7 of 16 infants, including *Escherichia coli* (3), *Salmonella enteritidis* (1), and a pure culture of coagulase-positive *Staphylococcus aureus* (3). Most patients were anemic at the onset of parenteral feeding and all but 1 patient had hypoproteinemia and hypoalbuminemia. The severe nutritional deficiencies were corrected in all infants, although 2 with chronic inflammatory bowel disease and 1 with intestinal lymphangiectasia also required surgery. Of the 16 patients, 13 thrived on a commercial formula after i.v. alimentation was initiated. Catheter sepsis developed in 5 patients who recovered after removal of the catheter and antibiotic therapy. Although i.v. alimentation is lifesaving, the procedure carries well-defined risks and should not be undertaken unless conservative measures have failed.

4835 PROTRACTED DIARRHEA OF INFANCY TREATED BY INTRAVENOUS ALIMENTATION. II. STUDIES OF SMALL INTESTINAL BIOPSY RESULTS. *(E.)* Shwachman, H.; Lloyd-Still, J. D.; Khaw, K. T.; Antonowicz, I. (Children's Hosp. Med. Ctr., Boston, Mass.). *Am. J. Dis. Child.* 125(3):365-368, 1973.

Biopsies of the small intestinal mucosa were taken from 11 infants with protracted diarrhea who were treated by i.v. alimentation. Biopsies were taken before treatment in 3, during treatment in 8, and after treatment in 7. Histological findings included moderately severe lesions (grade III) in 6, grade II changes in 3, and almost normal mucosa (grade I) in 2 patients. Polymorphonuclear cells were visible in the lamina propria and, occasionally, in the epithelium in 2 cases, and intraepithelial bacteria or bacterial debris was detected in 4. Increased numbers of eosinophils were found in 7 infants, 4 of whom had intestinal allergies. Lymphangiectasia, which may be related to edema that developed secondary to hypoalbuminemia, occurred in 2. Morphological findings definitely improved after 2-4 weeks of parenteral feeding in 2 of the 3 patients followed before, during, and after treatment; virtually no change occurred in 2 months in the remaining patient. Morphological normalization was seen in 5 of the 6 infants followed after treatment. The remaining patient, who had the most severe lesion initially, still has grade II changes 18 months later. Secondary disaccharidase deficiencies were diagnosed in 7 of the 11 patients, and 2 of these 7 still have lactase deficiency after 26 and 34 months, resp. Clinical response to parenteral feeding occurred more rapidly than normalization of morphological findings and disaccharidase activities.

4836 VIBRIO PARAHAEMOLYTICUS GASTROENTERITIS IN MARYLAND. I. CLINICAL AND EPIDEMIOLOGIC ASPECTS. *(E.)* Dadisman, Jr., T. A.; Nelson, R.; Molenda, J. R.; Garber, H. J. (Maryland State Dept. Health Mental Hyg., Baltimore). *Am. J. Epidemiol.* 96(6):414-426, 1973.

During August 1971, 3 food-borne disease outbreaks caused by the *Vibrio parahaemolyticus* occurred in Maryland. In 2 of these outbreaks, steamed crabs were the vehicle of infection, and in the third, crab salad prepared from canned crabmeat. The outbreaks involved about 425 ill persons (57.0%) of an estimated 745 at risk. The incubation period was 13 to 23 hr. Symptoms were severe diarrhea, abdominal cramps, nausea, vomiting, headache, chills, and mild fever persisting for 1-5 days. There were no deaths. In each outbreak, the organism was recovered from the stools of ill persons and from crabs and crabmeat. The steamed crabs became contaminated after cooking, probably while being transported and stored with live crabs. The processed crabmeat was probably contaminated while being picked and canned. *V. parahaemolyticus* has been found in United States coastal waters, sediment, fish, and shellfish, and it is now known to cause human gastroenteritis in this country.

4837 ALIMENTARY HYPOGLYCEMIA ASSOCIATED WITH THE ZOLLINGER-ELLISON SYNDROME. *(E.)* O'Brien, T. K.; Tijtgat, G.; Ensinck, J. W. (Univ. Washington, Sch. Med., Seattle). *Am. J. Med.* 54 (4):637-644, 1973.

A 44-yr-old women had clinical and laboratory evidence of Zollinger-Ellison syndrome, hyperparathyroidism, and reactive hypoglycemia. The findings of an "endocrine-like" tumor in the duodenal wall, with diminished plasma gastrin levels after its resection and chief cell hyperplasia of the parathyroids, indicated she had multiple endocrine adenomatosis. Excessive insulin release coincided with peak glucose concentrations in plasma after the administration of glucose (100 g p.o.); hypoglycemic episodes occurred at 2 to 3 hr. The presence of a pancreatic neoplasm or hyperplasia as a cause of the hyperinsulinism in this patient was ruled out by normal β-cell responses to the i.v. administration of glucose, tolbutamide (1 g), and glucagon (1 mg) and the absence of pancreatic disease at laparotomy. The exaggerated insulin secretion and hypoglycemia were attenuated by the intragastric administration of sodium bicarbonate (100 ml of a 0.4% solution) and by methscopolamine bromide (2.5 mg p.o. every 4 hr for 1 day prior to oral glucose testing), both of which delay gastric emptying. Although the factors responsible for the hyperinsulinism cannot be absolutely resolved, from the excessive acid production and hypergastrinemia in this patient, it is inferred that increased gastric emptying may have contributed significantly to her alimentary hypoglycemia. None of the enteric hormones which have been proposed as insulinotropic factors appears to be implicated in this patient's postprandial hypoglycemia, but the possibility that an unidentified enteric factor is involved cannot be ruled out.

4838 ANGIOGRAPHIC FINDINGS IN PNEUMATOSIS CYSTOIDES INTESTINALIS. *(E.)* Lunderquist, A.; Svendler, C. A.; Kornhall, S. (Univ. Hosp., Lund, Sweden). *Am. J. Roentgenol. Radium Ther. Nucl. Med.* 117(2):314-316, 1973.

Pneumatosis cystoides intestinalis, confined to the splenic flexure of the colon, is reported in 2 patients, a 65-yr-old woman and a 66-yr-old man. Asthma and polycystic kidneys were associated diseases in 1 case, while the other patient had cholelithiasis. The only abnormality seen at angiography of the inferior mesenteric artery was a relatively sparse vascularization of that part of the bowel and displacement of the vasa recta in the bowel wall around the cysts in 1 case; angiograms were normal in the other patient.

4839 IRRIGATION OF THE PERITONEAL CAVITY WITH CEPHALOTHIN. *(E.)* Rambo, W. M. (Med. Univ. South Carolina, Charleston). *Am. J. Surg.* 123(2):192-195, 1972.

The efficacy of intraoperative cephalothin irrigation of the peritoneal cavity was evaluated in 94 operative procedures on 92 patients. Patients with the following diagnoses were irrigated with cephalothin or saline solution, resp.: perforation of the colon (10, 13), perforation of other viscus (4, 12), gangrenous appendicitis (6, 7), gangrenous bowel (6, 2), micellaneous emergencies (11, 13), miscellaneous elective surgery (7, 3). Miscellaneous emergencies irrigated with cephalothin or saline solution, resp. included: tubo-ovarian abscess (2, 0), generalized peritonitis (1, 2), reoperation for suture line leak (2, 1), small bowel obstruction with enterotomy (2, 3), emergency colectomy (1, 0), emergency gastrectomy (1, 2), pancreatitis (1, 0), acute appendicitis (1, 0), ruptured bladder (0. 1), reoperation for hemorrhage (0, 1), and negative laparotomy (0, 1). The study was prospective and double blind and the patients were selected for the cephalothin or control group on a random basis. Evaluation of the groups with regard to wound infections, failure to control intraperitoneal sepsis as indicated by intraabdominal abscess or continuing peritonitis, and total number of deaths failed to reveal any significant difference between them. Thus, copious cephalothin irrigation appears to be no more or less effective than copious saline irrigation in the patient with peritonitis.

4840 SURGICAL PALLIATION OF MASSIVE AND SEVERE OBESITY. *(E.)* Weismann, R. E.; (Dartmouth Med. Sch., Hanover, New Hampshire). *Am. J. Surg.* 125(4):437-446, 1973.

Jejunoileal bypass was performed on 123 massively or severely obese subjects (89 women and 34 men, aged 15-65 yr) who failed to respond to medical treatment. Payne's end-to-side technique was used in 121 and the Salmon procedure in 2. In 80 patients panniculectomy was performed concomitantly. Starvation ketosis and anorectal irritation, occasionally leading to painful fissure, were common problems after surgery. Postoperative deaths during the first 6 months resulted from pulmonary embolism (2) and upper gastrointestinal bleeding and necrosis of the liver induced by advanced starvation from vomiting (1). Late complications included incisional hernias in 3 patients and intussusception of the jejunum in 1. Only 4 patients needed therapy for hypokalemia, but vitamin B_{12} absorption was markedly impaired, and parenteral vitamin B12 must be given indefinitely. Bypass reversal was necessary in 2 patients. Acceptable weight loss in a 12-18 month period was observed postoperatively in more than 90% of patients followed for 1 yr or more. Biopsies performed at surgery showed mild to severe fatty liver in 88 patients and cirrhosis in 2. In 40 patients who had liver biopsies after surgery, fatty infiltration with some quantitative increase was found 6-12 months after surgery and a decrease or clearing of fatty infiltration after 12-24 months. Liver function tests showed a similar pattern postoperatively. Good correlation was observed between serum carotene values and the weight level eventually attained. Reoperation to increase malabsorption was performed on 7 patients in whom the functioning length of proximal jejunum was considerably longer than the original length. Histologically it was confirmed that this lengthening is due to hypertrophy. These reoperations produced less satisfactory weight losses than a properly performed primary procedure but appeared to be helpful to all but 1 patient.

4841 PROGNOSTIC IMPLICATIONS OF CALCIUM-MEDIATED GASTRIN LEVELS IN THE ULCEROGENIC SYNDROME. *(E.)* Sanzenbacher, L. J.; King, D. R.; Zollinger, R. M. (Ohio State Univ. Coll. Med., Columbus). *Am. J. Surg.* 125(1):116-121, 1973.

Calcium-stimulated gastrin levels were studied in 6 patients 6 months to 17.5 yr after total gastrectomy. These 6 had histologically confirmed ulcerogenic non-beta cell tumors with gross evidence of hepatic metastases (2), microscopic involvement of the regional nodes (2), and benign adenomas (2). After a 1-hr control period during which 125 ml saline were infused i.v., a loading dose of calcium (2.5 mg/kg) was injected over 15 min. Then 15 mg/kg calcium in a calcium gluconate solution was infused over a 4-hr period. Observations indicate that routine fasting gastrin levels during the postgastrectomy follow-up period may be inaccurate in identifying patients with retained functioning tumor, and the calcium-stimulated gastrin survey may provide a more effective means of such detection and be a helpful tool in evaluating the concept of tumor regression after "target organ" removal. Additional experience should provide data indicating whether i.v. secretin is preferable to calcium infusion.

4842 THE RADIOLOGY OF TUBERCULOSIS OF THE GASTRO-INTESTINAL TRACT. *(E.)*

Werbeloff, L.; Novis, B. H.; Bank, S.; Marks, N. (Groote Schuur Hosp., Cape Town, South Africa). *Br. J. Radiol.* 46(545):329-336, 1973.

The radiological appearance is described for 117 cases of tuberculosis of the gastrointestinal tract seen over a 10-yr period. In only 44 cases was there evidence of pulmonary tuberculosis. The series included 3 cases of esophageal, 2 of gastric, 3 of pyloroduodenal, and 10 of mesenteric lymph node tuberculosis, 17 cases of malabsorption or protein-losing enteropathy, 3 of small bowel strictures, 11 ileocecal lesions, 10 colonic tubercles, and 58 of tuberculous peritonitis. The radiological appearance of gastrointestinal tuberculosis depends on the presence of ulceration, fibrosis, enlarged lymph nodes, or caseous lesions with abscess formation. Tuberculous lesions in segments of the gastrointestinal tract other than the ileocecal region are often radiologically suggestive of neoplasms. Gastric tuberculosis has no pathognomonic features. Most cases require laparotomy or peritoneoscopy to confirm the diagnosis histologically. The finding of an organic lesion in the gastrointestinal tract of a pulmonary tuberculosis patient or in a patient exposed to this disease should suggest the possibility of the lesion being tubercular. Abdominal tuberculosis can not be excluded by a negative chest x-ray.

4843 GASTROENTERITIS WITH NECROTIZING ENTEROCOLITIS IN PREMATURE BABIES. *(E.)*

Stein, H.; Beck, J.; Solomon, A.; Schmaman, A. (Baragwanath Hosp., Johannesburg, South Africa). *Br. Med. J.* 2(5814):616-619, 1972.

Eleven premature babies developed necrotizing enterocolitis in an epidemic of gastroenteritis and salmonella infection. This occurred in 1 of 2 premature baby wards over a period of 10 weeks. All babies were Negro with 7 males and 4 females. Pregnancies in 9 cases were normal; 1 mother had hypertension and was syphilitic. Hypothermia occurred in 8 cases during the first 24 hr; 4 had apnea; 2 had mild respiratory diseases; 5 had jaundice with serum bilirubin levels above 10 mg/100 ml; and 2 required exchange transfusions. All had diarrhea before the development of necrotizing enterocolitis. Of the 6 confirmed salmonella infections, 5 were caused by *Salm. thompson* and 1 by *Salm. johanesburg*. On radiography (10 examinations) all had gross abdominal distension, 2 showed intrahepatic gas, and 1 evidenced free gas in the peritoneum indicating bowel perforation. Platelet counts in 7 of 8 of these babies were below 100,000/mm^3. Prothrombin indices were low in 6 of 9. Mortality was 100%. No cases of necrotizing enterocolitis occurred in the unaffected ward during the same period. All other possible factors which might have predisposed to necrotizing enterocolitis occurred with equal freqency in both wards. There is little doubt that infection was the significant factor in the pathogenesis.

4844 PRODUCTION OF FATAL ENDOTOXIC SHOCK BY VASOACTIVE SUBSTANCES. *(E.)*

Cuevas, P.; Fine, J. (Boston City Hosp., Mass.). *Gastroenterology* 64(2):285-291, 1973.

Vasoactive agents were given i.v. by continuous infusion for 3-4 hr to normal rabbits and to rabbits pretreated with intraintestinal kanamycin or made resistant to endotoxin. The agents were: bradykinin (0.1 mg/kg), serotonin (0.1 mg/kg), and histamine (1.0 mg/kg). Untreated rabbits developed a fatal endotoxemia of intestinal origin. The titers of endotoxin in peritoneal fluid and plasma indicate that vasoactive substances do this by allowing endotoxin to move transmurally into the peritoneal cavity. Those rabbits in which the endotoxemia was only transient or prevented altogether did not develop lasting functional or structural damage and survived. Those in which it persisted developed the typical lesions of endotoxic shock in the lung and intestine and died. The persistence of the endotoxemia after stopping the infusion of the vasoactive substances suggests that circulating endotoxin initiates the further release from tissue sources and so creates a self-sustaining process. These data suggest that the endotoxemia which has been identified in various types of shock-producing septic or nonseptic trauma can be initiated by the continuous release of vasoactive substances from the site of trauma. They also demonstrate that these substances do not produce lasting injury in the absence of endotoxin. Systemic blood pressure response varied. Bradykinin produced immediate and pronounced hypotension followed by rapid return to normal and then by a hypertensive state until infusion ceased. Refractory shock caused death 10-12 hr later. Serotonin caused immediate hypotension which progressed until death, 8-10 hr after infusion started. Hypotensive response to histamine was less marked and after 2 hr blood pressure returned to near normal; however, shock developed 1-2 hr later and death occurred in 6-7 hr.

4845 PARESTHESIAS, WEAKNESS, SEIZURES, AND HYPOPHOSPHATEMIA IN PATIENTS RECEIVING HYPERALIMENTATION. *(E.)*

Silvis, S. E.; Paragas, Jr., P. D. (VA Hosp., Minneapolis, Minn.). *Gastroenterology* 62(4):513-520, 1972.

Unusual complications were observed during parenteral hyperalimentation of 3 starved individuals. These 3 cases included a 43-yr-old man with regional ileitis of 24 yr duration; a 60-yr-old man with a 10-yr history of duodenal ulcer complicated by adenocarcinoma of the pancreas, subphrenic abscess, and colonic fistula; and a 25-yr-old male with a 7-yr history of regional ileitis associated with many enterocutaneous fistulae and requiring resection of the jejunum and sigmoid colon followed by colostomy. The patients all developed hypophosphatemia (mean serum phosphate of 0.3 mg/100 ml) and muscular weakness immediately prior to the onset of difficulties. Of the 3 patients, 2 had paresthesias, convulsions, and coma. One patient died in coma. The reaction was probably recognized earlier in the other patients. The symptoms began 4-7 days after the beginning of hyperalimentation in these starved humans. Hyperosmolar, uremic, and ketoacidotic coma have been excluded as causes of the symptoms described. Observation of patients with severe chronic weight loss for weakness, paresthesias, or lowered serum inorganic phosphorus may be of value in early detection of this problem. Slow initial rates of infusion may prevent fatal reactions in susceptible individuals. With the onset of paresthesias the caloric intake should be reduced.

4846 TOTAL PARENTERAL ALIMENTATION, WITH LIPID.

(E.) Zohrab, W. J.; McHattie, J. D.; Jeejeebhoy, K. N. (Toronto Gen. Hosp., Canada). *Gastroenterology* 64(4):583-592, 1973.

The optimal nutritive requirements for total parenteral alimentation and the value of lipid emulsion in the safe delivery of this requirement were reviewed in 48 consecutively treated patients. Of the 48 patients, 3 were infused twice for a total of 51 infusions. The mean period of treatment was 31 days. Infusion of casein hydrolyzate (1 g/kg/day) and of 40-50% of the total calories as lipid emulsion resulted in positive nitrogen balance and other desirable changes in parameters of metabolism. The significant correlation found between the total caloric intake and the induced weight gain suggested that as little as 32.5 kcal/kg/day may maintain weight. The primary indications for using this technique included enterocutaneous fistula (18 infusions), fibro-inflammatory bowel disease (16), severe peritonitis (6), erosive esophagitis (5), pancreatitis (2), mesenteric infarction (1), short bowel (1), pharyngoplasty (1), and gluten-insensitive enteropathy (1). It is suggested that with moderation in the total caloric supply, particularly that part derived from glucose, many of the complications hitherto associated with this form of alimentation can be avoided.

4847 ZOLLINGER-ELLISON SYNDROME TYPE 1: CLINICAL AND PATHOLOGICAL CORRELATIONS IN A CASE.

(E.) Cowley, D. J.; Dymock, I. W.; Boyes, B. E.; Wilson, R. Y.; Stagg, B. H.; Lewin, M. R.; Polak, J. M.; Pearse, A. G. E. (Univ. Hosp. South Manchester, London, England). *Gut* 14(1):25-29, 1973.

A 17-yr-old male with Zollinger-Ellison syndrome type 1, i.e., hypergastrinemia and hyperplasia of the antral G cells but no tumor, was treated by vagotomy and antrectomy and the fasting plasma gastrin and acid secretion subsequently returned to normal. The patient had a 4-yr history of duodenal ulcer. Gastric secretion tests showed acid hypersecretion. Fasting plasma gastrin was 8350 pg/ml (normal 50-170 pg/ml). At laparotomy duodenal ulceration was confirmed, but no pancreatic or other tumors were found. Truncal vagotomy and antrectomy were combined with distal pancreatectomy. Immunofluorescent staining showed hyperplasia of G cells in the resected antrum but a normal pancreas and duodenum. He was asymptomatic and acid secretion was reduced by 92% 6 months after operation. The fasting plasma gastrin at 2 months was <50 pg/ml. These findings suggest that type 1 Zollinger-Ellison syndrome may be a clinical entity.

4848 GEL FILTRATION STUDIES ON IMMUNOREACTIVE GASTRIN IN SERUM FROM ZOLLINGER-ELLISON PATIENTS.

(E.) Rehfeld, J. F.; Stadil, F. (Bispebjerg Hosp., Copenhagen, Denmark). *Gut* 14(5):369-373, 1973.

Sera from 15 patients with the Zollinger-Ellison syndrome were subjected to gel filtration on Sephadex G-50 superfine columns (10 x 2000 mm). The concentration of gastrin in the effluent was determined by a sensitive radioimmunoassay. Four components of immunoreactive gastrin were eluted from 14 sera. Component I, eluted in the same position as proinsulin, constituted 9.7% of the total immunoreactivity. Component II ('big gastrin'), eluted between proinsulin and insulin, constituted 57.8% of immunoreactive gastrin. In three sera with the highest concentration of gastrin, component II appeared biphasic, suggesting that it contains at least 2 gastrins. Component III ('little gastrin') was distributed in two peaks; the first eluted in the same position as the heptadecapeptide gastrin II made up 17.4% of the total immunoreactivity; the second eluted in the same position as gastrin I constituted 9.5%. Component IV ('minigastrin') was eluted immediately before the salt peak and constituted 5.6%. In one serum, only components I and II were present. After incubation with trypsin all immunoreactivity in components I and II was converted to heptadecapeptide-like gastrins. The findings suggest that immunoreactive gastrin in serum from Zollinger-Ellison patients is circulating in at least 4 components of different molecular size. Whether these components are all paired as the heptadecapeptides in component III and the 2 phases of component II, is not clear.

4849 TRANSPORT OF GLUCOSE AND AMINO ACIDS IN HUMAN JEJUNUM DURING ASIATIC CHOLERA.

(E. Rohde, J. E.; Cash, R. A. (Cholera Res. Lab., Dacca, Bangla Desh). *J. Infect. Dis.* 127(2):190-192, 1973

The ability of jejunal mucosal cells from 7 patients with cholera to concentrate several substrates was measured quantitatively. This was done to test the capacity of the cholera-infected human intestine for active transport of sugar and amino acids. Biopsies of jejunal mucosa were obtained during and after the acute diarrhea of cholera, and the mucosal cell uptake of α-methylglucoside, L-lysine, and L-leucine was measured *in vitro*. There was no difference between control and diseased tissues in the ability to concentrate these substances. It is concluded that the mechanisms of cellular accumulation for glucose, and for neutral and acidic amino acids are not significantly affected by cholera. Despite the sprue-like morphology found in a majority of jejunal tissues studied, concentrations of substrates were similar to those reported from normal occidental volunteers. This study indicates that at least 3 absorptive pathways remain open during cholera and it suggests that the additive effect of stimulated fluid absorption in each pathway might be of clinical value in the treatment of cholera.

4850 VIBRIO PARAHAEMOLYTICUS GASTROENTERITIS IN MARYLAND: CLINICAL AND EPIDEMIOLOGIC ASPECTS. *(E.)* Dadisman, Jr., T. A.; Nelson, R.; Molenda, J. R.; Gabber, H. J. (Maryland State Dept. Health Mental Hyg., Baltimore). *J. Milk Food Technol.* 36(2):111-112, 1973.

During August, 1971, 3 separate foodborne disease outbreaks occurred in Maryland, involving about 425 (57%) persons of an estimated 745 at risk. In each outbreak, steamed crabs or crabmeat was the suspected vehicle of disease transmission. In each instance there was contact between steamed and live crabs. From the crab and from the stools of some ill persons in each outbreak, *Vibrio parahaemolyticus* was isolated. *V. parahaemolyticus* has also been recovered from live crabs and from the water of the Chesapeake Bay. It is noted that stool and food specimens must be cultured on thiosulfate citrate bile salts agar since routine enteric media do not have the required salt concentration and will not support the growth of *V. parahaemolyticus*.

4851 REDUCTION OF LYMPHOCYTE TRANSFORMATION BY A FACTOR PRODUCED BY GASTROINTESTINAL CANCER. *(E.)* Edwards, A. J.; Rowland, G. F.; Lee, M. R. (St. Bartholomew's Hosp., London, England). *Lancet* (7805):687-689, 1973.

The transformation of systemic lymphocytes by phytohemagglutinin is reduced when lymphocytes are cultured with portal serum from patients with operable gastrointestinal cancer. In 3 patients cancer was located in the colon; in the remaining 3, in the stomach. Patients who had a laparotomy for other reasons (3 patients with peptic ulcer and 3 with cholecystitis), or patients with malignant tissue with a blood supply that did not drain into the portal tract (non-regional cancer affecting the bladder in 3 cases, mid-third esophagus in 1, and hepatic duct in 1), did not demonstrate a reduction of phytohemagglutinin-induced transformation when their systemic lymphocytes were cultured in portal serum. These results suggest that host resistance to a tumor is locally inhibited by a humoral factor produced by malignant tissue.

4852 RELATIONS OF CALCITONIN AND GASTRIN IN THE ZOLLINGER-ELLISON SYNDROME AND MEDULLARY CARCINOMA OF THE THYROID. *(E.)* Sizemore, G. W.; Go, V. L. W.; Kaplan, E. L.; Sanzenbacher, L. J.; Holtermuller, K. H.; Arnaud, C. D. (Mayo Clin., Rochester, Minn.). *N. Engl. J. Med.* 288(13): 641-644, 1973.

Fasting plasma immunoreactive human calcitonin and fasting serum immunoreactive human gastrin were measured by specific radioimmunoassay in 16 healthy persons, 8 patients with the Zollinger-Ellison syndrome who had no clinical thyroid disease, and 7 patients with medullary carcinoma of the thyroid. All 8 patients with Zollinger-Ellison syndrome had duodenal ulcers, a high level of basal gastric acid secretion, and non-beta islet-cell tumors. All patients with the Zollinger-Ellison syndrome had high serum immunoreactive gastrin, and all with medullary carcinoma of the thyroid had high plasma immunoreactive calcitonin. Plasma immunoreactive calcitonin was increased significantly in 6 patients with the Zollinger-Ellison syndrome and was normal in the remaining 2 patients. Mean serum immunoreactive gastrin was decreased significantly in the patients with thyroid carcinoma. One patient with the Zollinger-Ellison syndrome and high plasma immunoreactive calcitonin had no postmortem histologic evidence of medullary carcinoma of the thyroid. These observations suggest a possible interhormonal relation between calcitonin and gastrin in man, with calcitonin inhibiting gastrin secretion and, conversely, gastrin stimulating calcitonin secretion.

4853 HISTOLOGICAL ALTERATIONS OF THE SMALL INTESTINE IN NORMAL INFANTS WITH ACUTE DIARRHEA. *(E.)* Toccalino, H.; Licastro, R.; Garcia Cardo, A.; Williams, M. (Alejandro Posadas Polyclin., Villa Sarmiento, Burnos Aires, Argentina). *Pediatr. Gastroenterol.* 4(3):129-134, 1972.

Histological examinations were made of per oral biopsies taken from 25 infants, aged 1 yr or younger, with acute diarrhea and from 8 controls, aged 8 months to 4 yr. A pediatric Crosby capsule was used to remove material at the level of the ligament of Treitz after an 8-hr fast and after 5-10 days of hospitalization and correction of water and electrolyte imbalance. Patients with acute diarrhea were divided into 2 groups: (1) 9 infants, aged 45 days to 7 months, were dehydrated and had pathogenic *Escherichia coli* in their stools and (2) 16 infants, aged 3-12 months, were dehydrated but had no evidence of bacterial infection. In 8 of the 9 patients in group (1) the height and width of the intestinal villi were decreased, epithelial cells were changed, and goblet cells were decreased; the lamina propria had infiltrates of lymphocytes and plasma cells and, occasionally, polymorphonuclear cells. Glands were slightly dilated. Increased migration of stromal cells toward the lumen was found in 4 cases. Similar, but less marked, changes were found in 14 of the 16 patients in group (2). No lesions were detected in 1 infant from group (1) and in 2 from group (2).

4854 THE EFFECT OF SECRETIN ON PLASMA GASTRIN IN THE ZOLLINGER-ELLISON SYNDROME. *(E.)* Schrumpf, E.; Petersen, H.; Berstad, A.; Myren, J.; Rosenlund, B. (Ulleval Hosp., Oslo, Norway). *Scand. J. Gastroenterol.* 8(2):145-150, 1973.

Graded doses of secretin were given, on separate days, to 3 patients (2 women and 1 man) with the Zollinger-Ellison syndrome. Plasma gastrin levels were determined by radioimmunoassay. A dose-dependent increase of the plasma gastrin concentration occurred in response to infusion of secretin (0.10-3.0 U/kg/hr). In one case, basal plasma gastrin levels rose from 520 pg/ml to 860 pg/ml after 45 min of secretin infusion. To a lesser extent the gastrin level was also increased by infusion of calcium. Large doses of secretin caused a small increase in serum calcium, but this did not occur until after the increase in plasma gastrin. The effect of atropine is uncertain. When given alone, a slight decrease in the gastrin level occurred in one case. When combined with secretin, practically the same elevation of plasma gastrin occurred as with secretin alone. Secretin and calcium stimulated gastric acid and pepsin secretion; atropine caused marked inhibition. It is suggested that secretin exerts an effect on the release or production of gastrin which is independent of an elevation in plasma calcium. Secretin could thus be a stimulating factor in the pathogenesis of tumors in the Zollinger-Ellison syndrome.

4855 SECRETIN-GASTRIN RELATIONSHIPS IN ZOLLINGER-ELLISON SYNDROME. *(E.)* Bradley, III, E. L.; Galambos, J. T.; Lobley, C. R.; Chan, Y.-K. (Emory Univ. Sch. Med., Atlanta, Ga.). *Surgery* 73(4):550-556, 1973.

A single bolus injection of secretin (3 U/kg i.v.) significantly increased serum gastrin levels, measured 20 to 60 min after injection, in 5 patients who had undergone total gastrectomy for Zollinger-Ellison syndrome. In another patient, who was awaiting surgery for suspected Zollinger-Ellison syndrome, the same dose of secretin increased calcium, had no effect on phosphorus, and appeared to decrease parathyroid hormone levels in the serum. These results demonstrate that in Zollinger-Ellison syndrome, absence of normal inhibition of gastrin by secretin does not depend upon the presence of gastric tissue. In gastrectomized patients, secretin-induced increases in serum gastrin may be due, in part, to excessive responsiveness to the relative hypercalcemia also induced by secretin; this hypercalcemia is unrelated to changes in parathyroid hormone. It is also possible that extragastric sites of gastrin production lack the necessary inhibitory mechanism, so that exogenous secretin does not affect gastrin levels or gastrin levels increase as a result of secretin-induced hypercalcemia.

4856 PATHOGENOUS ENTEROBACTERIA IN STOOL CULTURES. I. A COMPARATIVE STUDY. *(E.)* Eiguer, T.; d'Empaire, M. (Carlos G. Malbran Natl. Inst. Microbiol., Buenos Aires, Argentina). *Acta Gastroenterol. Latinoam.* 4(4):175-180, 1972.

4857 PATHOGENOUS ENTEROBACTERIA IN STOOL CULTURES. II. ASSOCIATIONS MOST FREQUENT. *(E.)* d'Empaire, M.; Eiguer, T. (Carlos G. Malbran Natl. Inst. Microbiol., Buenos Aires, Argentina). *Acta Gastroenterol. Latinoam.* 4(4):181-185, 1972.

4858 SAINT'S TRIAD. *(E.)* Palmer, E. D. (Morristown Mem. Hosp., N.J.). *Am. Family Phys.* 6(6):70-72, 1972.

4859 EFFECT OF ANTIBIOTICS ON ENTEROBACTERIA IN THE INTESTINAL FLORA DURING THE NEONATAL PERIOD. *(Fr.)* Tessier, F.; Daguet, G. L. (St. Antoine Hosp., Paris, France). *Ann. Pediatr. (Paris)* 18(8/9):563-567, 1972.

4860 OMPHALOCELE AND GASTROSCHISIS. *(E.)* Mahour, G. H.; Weitzman, J. J.; Rosenkrantz, J. G. (Childrens Hosp. Los Angeles, Calif.). *Ann. Surg.* 177(4):478-482, 1973.

4861 NECROTIZING ENTEROCOLITIS IN LEUKEMIA. *(E.)* Steinberg, D.; Gold, J.; Brodin, A. (Mt. Sinai Sch. Med., City Univ. New York, N.Y.). *Arch. Intern Med.* 131(4):538-544, 1973.

4862 NUCLEAR DNA IN SALIVARY GLAND TUMORS. I. WARTHIN TUMORS, BENIGN MIXED TUMORS, AND MUCOEPIDERMOID CARCINOMAS. *(E.)* Kino, I.; Richart, R. M.; Lattes, R. (Columbia Presbyterian Med. Ctr., New York). *Arch. Pathol.* 95(4):245-251, 1973.

4863 GASTROINTESTINAL BLOOD LOSS FROM ASPIRIN AND SODIUM SALICYLATE TABLETS IN MAN. *(E.)* Leonards, J. R.; Levy, G. (Sch. Med., Case-Western Reserve Univ., Cleveland, Ohio). *Clin. Pharmacol. Ther.* 14(1):62-66, 1973.

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4867 SALMONELLOSIS PRESENTING WITH CHOLERA-LIKE DIARRHOEA. *(E.)* Axon, A. T. R.; Poole, D. (St. Thomas' Hosp., London, England). *Lancet* (7806):745-746, 1973.

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4880 FAMILIAL OCCURRENCE OF VON WILLEBRAND'S DISEASE, THROMBOCYTOPENIA, AND SEVERE GASTROINTESTINAL BLEEDING. *(E.)* Corder, M. P.; Culp, N. W.; Barrett, Jr., O. (Letterman Gen. Hosp., Presidio San Francisco, Calif.). *Am. J. Med. Sci.* 265(3):219-223, 1973.

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4891 COMPARATIVE STUDY OF BERBERINE SULPHATE WITH NEOMYCINE & CHLORAMPHENICOL-STREPTOMYCIN IN ACUTE GASTROENTERITIS. *(E.)* Banerjee, K. L.; Bhattacharyya, B. (R. G. Kar Med. Coll. Hosp., Calcutta, India). *Calcutta Med. J.* 69(4):79-82, 1973.

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4901 GASTROENTERITIS OF INFANCY. *(E.)* Ironsid A. (no affil.). *Medicine* 6:467-474, 1972/1973.

4902 ALIMENTARY HYPOGLYCEMIA IN THE ABSENCE OF GASTROINTESTINAL SURGERY. *(E.)* Permutt, M. A.; Kelly, J.; Bernstein, R.; Alpers, D. H.; Siegel, B. A.; Kipnis, D. M. (Washington Univ. Sch. Med., St. Louis, Mo.). *N. Engl. J. Med.* 288(23): 1206-1210, 1973.

4903 BENIGN RED PIGMENTATION OF STOOL RESULTING FROM A FOOD COLORING IN A NEW BREAKFAST CEREAL (THE FRANKEN BERRY STOOL). *(E.)* Payne, J. V (Univ. Maryland Sch. Med., Baltimore). *Pediatrics* 49:293-294, 1972.

4904 DETECTION AND DELINEATION OF ABDOMINAL ABSCESSES IN RABBITS WITH ^{67}Ga. *(E.)* Harvey, W. C.; Silva, J.; Haines, Jr., R. S. (no affil.). *Radiology* 107(3):681-682, 1973.

4905 THE REDOX STATE OF THE LIVER IN SYMPTOMATIC PORPHYRIA. *(E.)* Shanley, B. C.; Joubert, S. M. (Dept. Chem. Pathol., Univ. Natal, Durban, South Africa). *S. Afr. Med. J.* 46(24):772-774, 1972.

4906 INDICATIONS FOR AND RESULTS FROM CYTOSTATIC THERAPY FOR GASTROINTESTINAL TUMORS. *(Ger.)* Brunner, K. W. (Inselspital, Bern, Switzerland). *Schweiz. Med. Wochenschr.* 103(5):171-178, 1973.

4907 STARCH PERITONITIS AFTER ABDOMINAL SURGERY. *(Ger.)* Aeberhard, P.; Pedrinis, E. (Inselspital, Bern, Switzerland). *Schweiz. Med. Wochenschr.* 103(5):333-337, 1973.

4908 MIXED TUMORS OF SALIVARY GLANDS: A 44 YEAR STUDY. *(E.)* Lanier, Jr., V. C.; McSwain, B.; Rosenfeld, L. (Nat. Naval Med. Ctr., Bethesda, Md.). *South. Med. J.* 65(12):1485-1488, 1972.

0000 FUNCTIONAL DISORDERS OF THE GASTROINTESTINAL TRACT. *(Ger.)* Fahrlander, H. (Munic. Hosp., Basel, Switzerland). *Dtsch. Med. J* 23(3):162-167, 1972.

4910 DIARRHEA SYNDROME IN CHILDREN. *(Ser.)* Zujovic, J. (Med. Fac., Univ. Belgrade, Yugoslavia). *Srp. Arh. Celok. Lek.* 100(2):251-254, 1972.

4911 MANAGEMENT OF STARCH PERITONITIS WITHOUT THE UNNECESSARY SECOND OPERATION. *(E.)* Warshaw, A. L. (Massachusetts Gen. Hosp., Boston). *Surgery* 73(5):681-685, 1973.

4912 HISTOLOGIC FINDINGS AND AMYLASE CONTENTS OF THE PANCREAS AND PAROTID GLAND OF RATS WITH EXPERIMENTAL PERITONITIS OR ILEUS. *(E.)* Kakizaki, G.; Noto, N.; Fujiwara, Y.; Oizumi, T.; Soeno, T.; Saito, T. (Akita Univ., Sch. Med., Japan). *Tohoku J. Exp. Med.* 108(2):155-164, 1972.

See also, 4227, 4232, 4239, 4246, 4268, 4283, 4289, 4413, 4415.

GENERAL

Parasitology

4913 GIARDIASIS: A CAUSE OF VITAMIN B_{12} MALABSORPTION. *(E.)* Cowen, A. E.; Campbell, C. B. (Roy. Brisbane Hosp., Australia). *Am. J. Dig. Dis.* 18(5):384-390, 1973.

Giardia lamblia was found in 3 patients shown to have vitamin B_{12} malabsorption which returned to normal after eradication of the parasite. All patients responded to metronidazole, 2 after 10 days with 200 mg 3 times/day; the 3rd required two 10-day periods of therapy. Radioactive vitamin B_{12} with sufficient amounts of biologically active intrinsic factor to exclude host intrinsic factor deficiency was administered. The subjects did not suffer from immunodeficiency states, and bacterial overgrowth did not appear to be a causative factor. It is concluded that competition between parasite and host enterocyte is the most likely explanation for the mechanism of vitamin B_{12} malabsorption in giardiasis.

4914 INTESTINAL CAPILLARIASIS. A NEW CAUSE OF A MALABSORPTION PATTERN. *(E.)* Paulino, Jr., G. B.; Wittenberg, J. (Boston City Hosp, Mass.). *Am. J. Roentgenol. Radium Ther. Nucl. Med.* 117(2):340-345, 1973.

Radiological examinations were made on 14 patients (11 males and 3 females, aged 10-65 yr) with severe diarrhea. All patients passed stools containing eggs of *Capillaria philippinensis*. The most common radiological abnormalities, which were found in all 14 patients, were scattering of barium in small clumps resembling snowflakes and thickening of the circular folds, mainly in the distal jejunum and proximal ileum. The latter abnormality may be related in part to the hypoalbuminemia which was commonly present in patients with this disease. Other radiological abnormalities included: dilatation of the small intestine (8); segmentation (5); increased fluid content (10); nodularity of the circular folds (5); and moulage, an effacement of the fold pattern in a dilated intestinal loop (3). All of these abnormalities most frequently affected the middle and distal jejunum and the proximal ileum. Pathologically, the most severe parasitic infestation and accompanying histological changes occurred in these areas. No abnormalities in transit time were found. In a single patient there was no parallelism in the severity of the abnormalities in any of the above 7 radiological features. Capillariasis is distinguished from hookworm, giardiasis, and *Strongyloides* mainly by the fact that the ileum is not spared in capillariasis.

4915 SCANNING OF THE HEPATIC BLOOD POOL IN LIVER AMEBIASIS.

(E.) Cuaron, A.; Gordon, F.; Munoz, R.; Landa, L. (Gen. Hosp., Natl. Med. Ctr. Mexico City). *Am. J. Roentgenol. Radium Ther. Nucl. Med.* 117(2):373-379, 1973.

A comparison was made between liver scans made with Fe and ^{113m}In coprecipitates and liver scans, taken a few hours later, with carrier-free, ionic ^{113m}In to show the distribution of the hepatic blood pool. These examinations were made on 125 patients with amebic abscesses of the liver. The diagnosis was confirmed by response to medical treatment, diagnostic puncture, or laparotomy or, in fatal cases, by necropsy findings. All liver scans obtained with colloidal ^{113m}In showed concentration defects which were single in 98 (78.4%) and multiple in 27 (21.6%). Scans made with carrier-free, ionic ^{113m}In showed single defects in 89 cases (71.2%) and multiple defects in 36 (28.8). The carrier-free ^{113m}In was more precise in depicting the size, shape, number, and position of the abscesses, but was less efficient than colloidal ^{113m}In in showing smaller lesions. However, when the abscess is located near the lower surface of the liver, the carrier-free ^{113m}In scan is useful since it labels the blood pool encircling the abscess and defines the boundaries of the lesion and does not imply that the abscess has spontaneously ruptured into the abdominal cavity. In these cases the information obtained with carrier-free, ionic ^{113m}In should be supplemented with a scan made with colloidal ^{113m}In.

4916 ESTABLISHMENT OF ENTAMOEBA HISTOLYTICA FROM LIVER ABSCESS IN MONOXENIC CULTURES WITH HEMOFLAGELLATES.

(E.) Wang, L. T.; Jen, G.; Cross, J. H. (U.S. Naval Med. Res. Unit No. 2, Taipei, Taiwan). *Am. J. Trop. Med. Hyg.* 22(1): 30-32, 1973.

Abscess fluid containing *Entamoeba histolytica* from 3 Taiwanese patients with amebic liver abscesses was introduced directly into hemoflagellate monoxenic cultures containing epimastigotes of *Trypanosoma cruzi* or *Trypanosoma conorhini* in a modified Diamond's TP-S monophasic medium. The amebae in the cultures grew slowly initially, but after serial subcultures they became adapted and multiplied rapidly with maximum growth occurring at 72 hr. Initial growth was better in association with *Trypanosoma cruzi* than with *Trypanosoma conorhini*, but once established the amebae grew equally well in association with either hemoflagellate. The 3 strains have been designated HT-10, HT-12, and HT-19.

4917 HOOKWORM IN GEORGIA. I. SURVEY OF INTESTINAL HELMINTH INFECTIONS AND ANEMIA IN RURAL SCHOOL CHILDREN.

(E.) Martin, L. K. (Tulane Univ. Sch. Public Health Trop. Med., New Orleans, La.). *Am. J. Trop. Med. Hyg.* 21(6):919-929, 1972.

In a survey in rural Georgia, 3,729 white elementary school children were examined for intestinal helminth infections and 5,016 were tested for anemia. The state was divided into 4 domains of study (I, north; II, north-central; III, south-central; IV, southeast), each having a different expected hookworm prevalence. Sample clusters were classrooms, grades 1, 3, 5, and 7, in pairs of rural schools in each of 7 randomly selected counties of every domain. Hematocrit and hemoglobin determinations were made at the schools, and fecal specimens were mailed to a central laboratory for quantitative diagnosis of helminthiases by a thick-smear technique. Data were recorded on mark-sensing sheets and analyzed by computer. In domains I to IV, 869, 959, 862, and 1,039 children, resp., were examined for parasites, and 0%, 1%, 4%, and 12%, resp., were positive for hookworm. Of the 172 hookworm infections, 48 were moderate or heavy in intensity. From 3 to 10% of the children had low hematocrit or hemoglobin levels, but fewer than half of the moderate to heavy hookworm cases were categorized as anemic, and even some very heavy infections were in children with normal hematocrit and hemoglobin. Of the 48 *Ascaris* infections detected, 4 were in domain I (<1% prevalence), 10 in domain II (1%), 3 in domain III (<1%), and 31 in domain IV (3%). More than twice as many *Ascaris* infections occurred in 1st-grade children than in children of any of the other three grades. About 1/3 of the cases were in the moderate to heavy category; 11 of these were in domain I, 5 cases (<1%) were found in domain II, 3 (<1%) in domain III, and 12 (1%) in domain IV. Of these 20 infections, 14 were light and 6 were of moderate to heavy intensity. The results of this survey indicate that hookworm remains endemic in rural southern Georgia, and it is expected that hookworm infections will persist in scattered families for the foreseeable future.

4918 HOOKWORM IN GEORGIA. II. SURVEY OF INTESTINAL HELMINTH INFECTIONS IN MEMBERS OF RURAL HOUSEHOLDS OF SOUTHEASTERN GEORGIA.

(E.) Martin, L. K. (Tulane Univ. Sch. Public Health Trop. Med., New Orleans, La.). *Am. J. Trop. Med. Hyg.* 21(6):930-943, 1972.

Using a stratified sampling technique, a household survey was conducted in 27 counties of southeastern Georgia in which 492 households (409 white and 83 black) were interviewed and 749 individuals (550 white and 199 black) were examined for intestinal helminth infections. Hookworm was found in 16%

of the whites and 8% of the blacks, the greatest prevalence in each race being in young adults. Hookworm infections were almost twice as prevalent in males as in females of both racial groups. Most residents of rural southeastern Georgia go without shoes out-of-doors and 46% of the whites and 16% of the blacks reported having had ground-itch at some time, although few had experienced it in the past year. Hookworm infections were more prevalent in individuals who went barefoot and who had experienced ground-itch in the previous year, although infections were also found in persons who consistently wore shoes and had never had ground-itch. As many hookworm infections were found in individuals of households which now practice sanitary disposal of wastes as in members of households which do not; however, most of these probably were acquired before the introduction of sanitary facilities. *Ascaris* infections were found in 1% of the white and 12% of the black household members, almost all of the infections being in the youngest age-group and most from households in which not all members practiced sanitary waste disposal. No *Trichuris* infections were found in black households, and only 4 cases occurred in the white group, all apparently old infections. The prevalence of helminthiases in southeastern Georgia continues to decline, but both hookworm and *Ascaris* infections will continue to be transmitted in the foreseeable future. These findings probably hold true also for geographically similar areas of other southeastern states.

4919 AN EVALUATION OF IMMUNOLOGICAL INDICATORS FOR AMEBIC DISEASE PREVALENCE.

(E.) Miller, M. J.; Scott, F.; Foster, E. F. (Dept. Trop. Med. Parasitol., Tulane Univ., New Orleans, La.). *Am. J. Trop. Med. Hyg.* 22(3):331-336, 1973.

Over a 5-yr period the incidence of amebic disease, i.e. manifest amebic ulcerative colitis and/or liver abscess, was determined in 9 semi-isolated Indian reservations in northern Canada with populations ranging from 260 to 552. Amebic disease occurred in only 4 of the 9 communities (average total of 36 cases/yr). However, stool examinations made on 24 apparently healthy school-children, aged 7-15 yr, on each reservation to determine the *Entamoeba histolytica* infection rate showed that children on all 9 reservations were infected. With the exception of 2 children on 1 reservation, all children on reservations free of endemic amebic disease were nonreactive in the indirect hemagglutination test, and positive reactions occurred in 8-21 children (33-90%) on reservations where amebic disease had occurred. No correlation was found between results from the indirect hemagglutination test and the presence or absence of parasites in the stools. Although reactors were found in all groups, a good correlation was observed between the percentage of children with positive intradermal skin tests and the average annual number of cases of disease reported for each reservation. These findings suggest that when no information is available on the amebic disease prevalence, rates for the intradermal skin test or the indirect hemagglutination test in as few as 24 schoolchildren can provide a reliable index for amebic disease prevalence in rural, semi-isolated communities of several hundred persons.

4920 IMMUNOLOGIC ASPECTS OF SCHISTOSOMIASIS.

(E.) Gamal, Y. E.; Mahgoub, S. E.; Shaker, A.; Wishahi, A.; Hassan, R. (Dept. Pediatr., Ain Shams Univ., Cairo, U.A.R.). *J. Trop. Med. Hyg.* 75(6):119-121, 1972.

Group I, consisting of 50 patients (18 males and 32 females, aged 5-18 yr) with uncomplicated gastrointestinal, urinary or genitourinary schistosomiasis and group II, consisting of 32 patients (12 males and 20 females of similar age range) with hepatic schistosomiasis were studied. In hepatic schistosomiasis total serum proteins and albumin decreased significantly and serum γ-globulin increased. Serum immunoglobulin (Ig) M and A underwent slight increases in 16 patients in group 1; 12 also had a marked increase in IgG. In group II, IgG was moderately or significantly increased in 93.7% of the cases; IgM and IgA were increased in 81.1% and 84.3%, resp. Immunoglobulins, particularly IgG, were significantly increased in patients with marked liver dysfunction and parenchymal cell degeneration. Perhaps such liver changes are the result of excessive immune response.

4921 SERUM GLYCOPROTEINS IN SCHISTOSOMAL HEPATIC FIBROSIS.

(E.) Ghanem, M. H.; Guirgis, F. K.; El-Sawy, M. (Dept. Med. Clin. Pathol., Univ. Alexandria, UAR). *J. Trop. Med. Hyg.* 76(1):13-15, 1973.

Serum glycoproteins have been studied in 24 patients (18 men and 6 women, aged 29-50 yr) with schistosomal hepatic fibrosis and 30 healthy matched controls. All 24 patients had splenomegaly with shrunken liver. Factors known to affect the serum glycoproteins level, apart from hepatic involvement, were excluded. Significant increases of protein-bound hexose, hexosamine, fucose, sialic acid and seromucoids have been found in advanced cases of schistosomal hepatic fibrosis. This rise in serum glycoprotein levels could be attributed mainly to active fibrogenesis and tissue destruction and partly to secondary parathyroid overactivity and impaired glucose tolerance, as well as to an associated autoimmune mechanism.

4922 GIARDIA INTESTINALIS. A PROSPECTIVE INVESTIGATION OF THE PREVALENCE IN DENMARK.

(E.) Dano, P.; Olsen, J.; Vejlscaard, R. (Rigshosp., Copenhagen, Denmark). *Scand. J. Gastroenterol.* 8(2):151-154, 1973.

A prospective study was made of the prevalence of *Giardia lamblia* in 190 patients, 104 women and 84 men, with primary gastrointestinal symptoms. Diagnoses included Crohn's disease (29), ulcerative colitis (9), chronic pancreatitis (19), chronic diarrhea (17), gastrectomy sequelae (16), peptic ulcer (13), dyspepsia (13), nontropical sprue (10), unspecified malabsorption (6), lactose malabsorption (2), chronic constipation (5), cholelithiasis (3), obesity (16), unspecified nephropathy (9), other gastrointestinal diseases (13), and other diseases (10). *Giardia lamblia* was found in only 1 patient, a prevalence of only 0.5%. The low prevalence of infestation in this series may result from autolysis of the trophozoite in the duodenal aspirate at the time of the microscopic examination, faulty placement of the duodenal tube, intermittent excretion of *Giardia* cysts in the feces, or it may be due to an actual decrease in the occurrence of infestation.

4923 LEISHMANIASIS IN BRAZIL: IX. CONSIDERATIONS ON THE LEISHMANIA BRAZILIENSIS COMPLEX:-IMPORTANCE OF SANDFLIES OF THE GENUS PSYCHODOPYGUS (MANGABEIRA) IN THE TRANSMISSION OF L. BRAZILIENSIS BRAZILIENSIS IN NORTH BRAZIL. *(E.)* Lainson, R.; Shaw, J. J.; Ward, R. D.; Fraiha, H. (Inst. Evandro Chagas, Belem, Para, Brazil). *Trans. R. Soc. Trop. Med. Hyg.* 67(2):184-196, 1973.

4924 PRESENT STATUS OF HELMINTHIASIS IN IRAN. *(E.)* Arfaa, F. (Sch. Pub. Health, Teheran Univ., Iran). *Trop. Geogr. Med.* 24(4):353-362, 1972.

4925 DISORDERED SMALL BOWEL PATTERN IN ASCARIASIS. *(E.)* Lagundoye, S. B. (Univ. Coll. Hosp., Ibadan, Nigeria). *Trop. Geogr. Med.* 24(3):226-231, 1972.

4926 PARAMETRIC EVALUATION OF THE PREVALENCE OF ENTAMOEBA HISTOLYTICA INFECTIONS IN IBADAN. *(E.)* Abioye, A. A.; Ogunba, O. (Univ. Coll. Hosp., Ibadan, Nigeria). *Trop. Geogr. Med.* 24(4):370-376, 1972.

4927 DISTRIBUTION OF INTESTINAL HELMINTHS IN CHILDREN IN THE YEMEN ARAB REPUBLIC. *(E.)* Thuriaux, M. C. (Child. Clin., Radda Barnen Riksforbund, Ta'izz, Yemen). *Trop. Geogr. Med.* 25(1):45-50, 1973.

4928 THE MODE OF ACTION OF CERTAIN DRUGS AGAINST HELMINTH PARASITES OF MAN. *(E.)* Frayha, G. J. (Sch. Public Health, American Univ. Beirut, Lebanon). *J. Med. Liban.* 25(6):507-520, 1972.

4929 AMEBOMA OF THE COLON. *(E.)* Yiotsas, Z. D.; Arnaoutis, P.; Dadinakis, A.; Doxiadis, T. (Evangelismos Med. Ctr., Athens, Greece). *Am. J. Gastroenterol.* 59(4):348-352, 1973.

4930 EXPERIENCE IN THE THERAPY OF AMEBIC LIVER ABSCESS ON TAIWAN. *(E.)* Tsai, S. H. (Tzu-yuan Hosp., Peikang, Taiwan, Rep. China). *Am. J. Trop. Med. Hyg.* 22(1):24-29, 1973.

4931 HISTOLOGIC PROCESSES OF HEALING IN HEPATIC INJURY DUE TO EGGS OF SCHISTOSOMA MANSONI IN MICE FOLLOWING CURATIVE CHEMOTHERAPY. *(E.)* Schiller, E. L.; Haese, W. H. (Sch. Med., Johns Hopkins Univ., Baltimore, Md.). *Am. J. Trop. Med. Hyg.* 22(2):211-214, 1973.

4932 EFFECTS OF SCHISTOSOMA MANSONI INFECTION ON INDUCTION OF TRYPTOPHAN OXIDASE IN MOUSE LIVERS. *(E.)* Brown, J. N.; Smith, T. M. (Univ. Mississippi Sch. Med., Jackson). *Comp. Biochem. Physiol.* 45B(2):487-489, 1973.

4933 STUDIES ON THE MICROBIOLOGY AND PHARMACOLOGY OF SULFAGUANOL, A NEW SULFONAMIDE WHICH IS ACTIVE IN THE INTESTINE. *(Ger.)* Kohlmann, F. W.; Kuhne, J.; Wagener, H. H.; Weifenbach, Y. (Res. Lab. Nordmark Werke, Uetersen/Holstein, Germany). *Arzneimittelforschung* 23(2):172-177, 1973.

4934 CONCEPTS IN HEPATIC AMOEBIASIS. *(E.)* Ramachandran, S.; Sivalingam, S.; Perumal, J. R. A. (Colombo N. Gen. Hosp., Ragama, Sri Lanka). *J. Trop. Med. Hyg.* 76(2):39-42, 1973.

4935 METRONIDAZOL IN THE TREATMENT OF AMEBIASIS AND GIARDIASIS. *(E.)* Jagic, H.; Bezjak, B.; Breitenfeld, V. (Univ. Fever Hosp., Zagreb, Yugoslavia). *Lijec. Vjesn.* 94(3):150-152, 1972.

4936 LEISHMANIASIS IN BRAZIL: VIII. OBSERVATIONS ON THE PHLEBOTOMINE FAUNA OF AN AREA HIGHLY ENDEMIC FOR CUTANEOUS LEISHMANIASIS IN THE SERRA DOS CARAJAS, PARA STATE. *(E.)* Ward, R. D.; Shaw, J. J.; Lainson, R.; Fraiha, H. (Inst. Evandro Chagas, Belem, Para, Brazil). *Trans. R. Soc. Trop. Med. Hyg.* 67(2):174-183, 1973.

4937 LEPTOSPIROSIS. *(E.)* Turner, L. (no affil. *Medicine* 2:494-497, 1972/1973.

4938 SCHISTOSOME OVA DEPOSITS IN THE APPENDIX. QUALITATIVE AND QUANTITATIVE HISTOPATHOLOGICAL FINDINGS IN BILHARZIAL APPENDICITIS. *(E.)* Schmid, H. (Univ. Dar es Salaam, Tanzania). *Pathol. Microbiol.* 38(5):362-374, 1972.

4939 CAPILLARIA HEPATICA INFESTATION IN A CHILD. *(E.)* Silverman, N. H.: Katz, J. S.; Levin, S. E. (South African Inst. Med. Res., Johannesburg). *S. Afr. Med. J.* 47(6):219-221, 1973.

4940 A CLINICAL TRIAL WITH FURAZOLIDONE AND IODOCHLORHYDROXYQUINOLINE IN INTESTINAL AMOEBIASIS. *(E.)* Bhattacharjee. B.: Mukherjee, A. K. (Calcutta Med. Coll., India). *Calcutta Med. J.* 69(4): 83-84, 1972.

4941 INTESTINAL PARASITES FOUND IN CHILDREN ATTENDING A SCHOOL IN BAHATI (NAIROBI) BY DIRECT EXAMINATION OF STOOL SMEARS. *(E.)* Wijers, J. B.; Kinyanjui, H.; Rijpstra, A. C. (Med. Res. Ctr., Nairobi, Kenya). *East. Afr. Med. J.* 49(12):989-995, 1972.

4942 AMOEBIASIS IN PEDIATRIC AGE GROUP. *(E.)* Bhalla, K. K.; Berry, A. M.; Ghosh, S.; Prakash, O. (Safdarjang Hosp., New Delhi, India). *Indian Pediatr.* 9(12):782-787, 1972.

4943 PROLAPSE OF THE RECTUM IN AMOEBIASIS. *(E.)* Chacko, R.; Viswanathan, J. (Inst. Child Health Hosp. Child., Madras, India). *Indian Pediatr.* 9(12):816-818, 1972.

4944 MULTIPLE AMOEBIC LIVER ABSCESSES A STUDY OF 56 CASES. *(E.)* Kapoor, O. P.; Joshi, V. R. (J.J. Group Hosp., Byculla, Bombay, India). *J. Trop. Med.* - -

4945 INTESTINAL LACTASE ACTIVITY IN HOOKWORM INFESTATION. *(E.)* Gupta, P. S.; Misra, R. C.; Baluja, S. C.; Sarin, G. S.; Chuttani, H. K. (Maulana Azad Med. Coll., New Delhi, India). *J. Trop. Med. Hyg.* 76(1):23-26, 1973.

See also, 4267, 4531, 4578, 4721.

NUMBERS FOLLOWED BY AN ASTERISK INDICATE ABSTRACTS. OTHER NUMBERS REFER TO CITATIONS.

AACH, R.
4781*
AAGAARD, P.
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ABOUNA, G.M.
4792
ACKROYD, F.W.
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ACOSTA, J.M.
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ADADEVOH, B.K.
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ADAM, A.
4494*
ADAMS, J.T.
4544
ADAR, R.
4798*
AEBERHARD, P.
4907
AFRIDI, S.K.
4443
AGRADI, E.
4766
AGUSTI PEYPOCH, J.
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AJDUKIEWICZ, A.
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AKIYAMA, K.
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AKOVBIANTZ, A.
4474
ALBRIGHT, N.L.
4557
ALEXANDER-WILLIAMS, J.
4382, 4483
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NUMBERS FOLLOWED BY AN ASTERISK INDICATE ABSTRACTS. OTHER NUMBERS REFER TO CITATIONS.

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4087
BALANZO, J.T.
3924*, 4062*
BALESTRAZZI, A.
4240
BALISON, J.R.
4040, 4324
BALTAXE, H.A.
4335
BALUJA, S.C.
4945
BALUYOT, R.
4327
BANATVALA, J.E.
4736*
BANERJEE, K.L.
4891
BANK, S.
4367*, 4842*, 4864
BANKOLE, M.A.
4436
BANWELL, J.G.
4505, 4510
BAR-MAOR, J.A.
4563
BARAK, A.J.
4125
BARAKAT, M.
4658
BARANY, F.
4371*
BARATTI, J.
4160*
BARBARINO, F.
3961
BARBIER, F.
4334
BARNARD, D.L.
4012
BARNES, G.L.
4415*
BARRETT, O., JR.
4880
BARROWMAN, J.A.
4092*
BARTELHEIMER, W.
4270
BARTLETT, R.H.
4426
BARTON, R.W.
4028*
BARTUS, S.A.
4338
BARZILAY, J.
4798*
BASS, D.D.
4049
BASS, P.
4027*
BATSAKIS, J.G.
4581
BATTLE, W.S.
4310, 4325
BAUER, C.
4793
BAUM, R.
4638
BAYLESS, T.M.
4516
BAYLEY, H.S.
4007
BAYLIN, G.J.
4656
BEALE, D.J.
4508
BEALES, J.S.M.
4231*
BEARD, R.W.
4100*
BEATTIE, E.J.
4326
BECK, I.T.
4106
BECK, J.
4843*
BECK, J.M.
4586
BECKERS, J.
4032
BEDI, B.S.
4394
BEDINE, M.S.
4275
BEDINGFIELD, J.R.
4733*
BEELEY, M.
4304
BEERMANN, B.
4011
BEHRINGER, G.E.
4557
BELIKOVA-ALDAKOVA, V.D.
4865
BELINSKY, I.
4266
BELL, C.C., JR.
4775*, 4776*, 4808*
BELLA, A., JR.
4065*
BEN-ARI, G.Y.
4090*, 4180
BENAROYA, Y.
4494*
BENEDETTI VALENTINI, G.
4605
BENEDETTI VALENTINI, S.
4605
BENHAMOU, J.P.
4704*
BENNESS, G.T.
4126
BENNETT, J.R.
4298*
BENNETT, R.C.
4583
BENTOLILA, A.
4142
BENZ, W.
4781*
BERBERIAN, M.
4732*
BERCI, G.
4237
BERDON, W.E.
4558
BERELOWITZ, M.
4696
BERGER, H.
4513
BERGER, S.
4694, 4739*
BERK, J.E.
4232*
BERK, R.N.
4831
BERMAN, J.K.
4331
BERMAN, M.C.
4696
BERNSTEIN, R.
4902
BERON, E.
4620
BERRY, A.M.
4942
BERRY, B.E.
4315
BERSTAD, A.
4096*, 4372*, 4854*
BERSTEIN, L.
4108
BERTACCINI, G.
4076
BERTHELOT, P.
4691
BERTI, F.
4041
BERTINO, J.R.
4170
BERTRAND, J.
4736*
BERZINS, U.J.
4438
BESSA, S.M.
4438
BEUTLER, E.
4692
BEZJAK, B.
4935
BHALERAO, R.A.
4689
BHALLA, K.K.
4942
BHAT, P.V.
4187

BHATTACHARJEE, B.
4940
BHATTACHARYYA, B.
4891
BHIWANKAR, N.T.
4383
BIANCHI, R.
4358
BIBER, B.
4201*, 4205
BIELKA, H.
3950
BIHLER, I.
3979*, 4175
BILLEWICZ-STANKIEWICZ, J.
4073, 4088, 4408
BILLINGS, J.A.
3993*
BILTON, J.L.
4463
BINDER, V.
4591*
BIRCHER, J.
4235*, 4774*
BIRGE, S.J.
4164*
BIRK, C.C.
4058*
BIRTCH, A.G.
4582
BISMUTH, H.
4801*
BLACK, O.
4098*
BLACK, R.B.
3925*
BLACK, W.D.
4398
BLACKLOW, N.R.
3942
BLACKWOOD, W.D.
4355
BLAISDELL, F.W.
4621
BLANC, D.
4648
BLANKART, R.
4774*
BLISS, B.P.
4885
BLOCK, M.A.
4268
BLOMHOFF, J.P.
4673*
BLOOM, S.R.
4100*, 4420*
BLUMEL, N.F.
4865
BLUMENTHAL, B.
4815
BLUMGART, L.H.
4427
BLYTHMAN, H.E.
3933*
BOCKMAN, D.E.
4655
BOHNDORF, W.
4317
BOICHIS, H.
4671*
BOILEAU, G.R.
4449
BOLIN, T.D.
4756*
BOLZANO, K.
4789
BOMBECK, C.T.
4310, 4325
BONFILS, S.
4066*
BONJOUR, J.P.
3977*
BONNEFOND, A.
4066*
BONNEVIE, O.
4591*
BONOMA, C.
4080
BOOTH, A.S., JR.
4631*
BOOTH, R.A.D.
4075
BORDES, M.
4528*
BORGEAUD, P.
4473
BORHANMANESH, F.
4728*
BORMAN, J.B.
4784
BORST-EILERS, E.
4695
BORTZ, W.M.
4115*
BOSWELL, S.H.
4656
BOTHA, J.B.C.
4864
BOTHRA, R.
4462
BOUCHER, B.J.
4456
BOUCHIER, I.A.D.
4813, 4817
BOUNOUS, G.
4056*, 4093*
BOURGEAUX, C.
4242, 4528*
BOURNE, H.R.
4195
BOWEN, J.C.
4799*
BOWIE, E.A.
4746
BOWN, R.
4529*
BOYE, N.P.
4760*
BOYES, B.E.
4847*
BRAASCH, J.W.
4252, 4592, 4822
BRABOW, W.O.K.
4742
BRACONIER, J.H.
4750
BRADLEY, E.L., III
4855*
BRAGANZA, J.
4234*
BRANDT, E.N., JR.
4075
BRANTIGAN, C.O.
4824
BRANTIGAN, O.C.
4824
BRASCA, A.P.
4111
BRASSCH, J.W.
4807*
BRASSI, G.B., JR.
4387
BRATLID, D.
4702*
BRAUN, S.A.
4373*
BRAUNSTEINER, H.
4789
BRAVERMAN, S.P.
4352
BREEN, J.
4438
BREEN, K.J.
4131, 4714*
BREITENFELD, V.
4935
BREMNER, C.G.
4079, 4385
BRIX JENSEN, P.
4575, 4580
BRODERSEN, M.
4258
BRODIN, A.
4861
BROOKS, A.P.
4203*
BROOKS, F.P.
4080, 4109
BROOKS, S.P.
4602*
BROWN, B.
4363*
BROWN, C.H.
4547
BROWN, J.C.
3963, 4420*
BROWN, J.J.
4395
BROWN, J.N.
4932
BROWN, R.E.
4700
BRUCH IGARTUA, E.
4284
BRUNNER, K.W.
4906
BRYK, D.
4459
BUCETA, J.C.
4110
BUCK, B.A.
4302
BUERK, C.A.
4339

NUMBERS FOLLOWED BY AN ASTERISK INDICATE ABSTRACTS. OTHER NUMBERS REFER TO CITATIONS.

BUGAJSKI, J.
4084, 4086
BULS, J.
4583
BUNCH, G.A.
4368*
BUNNELL, I.L.
4674*
BURDETT, K.
4165*
BURKE, V.
4886
BURWOOD, R.J.
4231*
BUSSEY, H.J.R.
4555
BUSSOLATI, G.
3973
BUTLER, C.J.
4635
BUTTLE, H.L.
4112
BUTZLER, J.P.
4262
BYRNE, J.J.
4362*
BYSTROM, J.
4430
CACHIN, M.
4543, 4649
CADRANEL, S.
4262
CAGOL, P.P.
4466
CAHOW, C.E.
4628*
CALNE, R.Y.
4666*
CAMERON, J.L.
4629*
CAMPBELL, C.B.
4913*
CAMPBELL, T.C.
4127
CAMPRA, J.L.
4772*
CANO, R.
4274
CAPUZZI, D.M.
4629*
CARBALLO, J.
4630*
CARDELL, R.R., JR.
3929*
CARLSON, W.E.
4007
CARMONA MUNOZ, J.
4278
CARNEVALE, N.J.
4446
CAROSI, P.G.
4144
CARR, K.E.
3947
CARROL, R.L., JR.
4453
CARROLL, C.P.
4717
CARRUTH, D.
4351
CARTER, D.C.
4534
CARTER, E.A.
4169*
CARTWRIGHT, G.E.
4670*
CASE, R.M.
4107
CASEBOLT, B.T.
4819
CASH, R.A.
4849*
CASPARY, W.F.
3994*
CASS, K.A.
4717
CASTELL, D.O.
4295*, 4297*
CASTILLO, R.G.
4488*
CASTRO, A.
4413*
CASTRO, J.A.
4136
CAVAGGIONI, A.
4076
CEDERBERG, A.
4647
CELLE, G.
3957
CHACKO, R.
4943
CHADWICK, R.
4138
CHAN, Y.K.
4855*
CHANDRA, S.V.
4610
CHANG, T.T.
4414*
CHANTURIIA, T.I.
4454
CHAPMAN, M.J.
4216
CHAPPEL, J.
4586
CHARUEL, C.
4093*
CHARUZI, I.
4784
CHASE, W.V.
4574
CHAUDHURI, S.
4510
CHAUDHURI, T.K.
4018
CHAWLA, R.C.
4044
CHEEK, J.A., JR.
4897
CHEN, W.F.
4698
CHEY, W.Y.
4352
CHHAPARWAL, B.C.
4263, 4791
CHITTINAND, S.
4432
CHIU, C.J.
4447
CHOISY, H.
4388
CHOPRA, P.
4469
CHOUDHARY, S.P.
4265
CHOUROULINKOV, I.
4184
CHOWDHURY, T.K.
3976*
CHRETIEN, P.B.
4257
CHRISTACOPOULOS, J.S.
4281
CHRISTENSEN, P.
4017
CHRISTIANSEN, J.
4333
CHRISTIANSEN, P.A.
3991*, 3995*, 4158*, 4159*
CHRISTOFFERSEN, P.
4769*
CHRYSTIE, I.L.
4736*
CHUNG, R.S.K.
3985*
CHUTTANI, H.K.
4945
CIANFICHI, R.J.
4505
CICCIMARRA, F.
4198
CIESLUK, S.
4743
CINA, G.
4571
CLARK, C.G.
4810, 4890
CLARK, M.L.
4419*
CLARKE, R.J.
4382
CLASSEN, M.
4082, 4259
CLAUSEN, E.
4672*
CLAUSS, R.H.
4318
CLEATOR, I.G.M.
4391, 4392
CLEMENTE, O.
4240
CLINE, R.E.
4733*
CLOP, J.
4650
CLOUTIER, R.
4624
COCCHERI, S.
4757*
COCCO, A.E.
4275
COHEN, G.H.
4675

COHEN, K.L.
4771*
COHEN, L.
4703*
COHEN, M.M.
4450
COHEN, N.
4475*
COHEN, S.
4294*
COHN, I., JR.
4894
COLCOCK, B.P.
4484
COLLETTE, M.
3953
COLMER M.R.
4412
COMBES, B.
4688, 4714*
COMBS, G.F., JR.
3932*
COMINGS, D.
4692
CONDON, R.E.
4632*, 4662*
CONN, H.O.
4787
CONNELLY, R.R.
4600*
CONNOCK, M.J.
3967
CONNOLLY, J.E.
4426
COOK, G.C.
4021, 4504
COOK, M.A.
3963
COOK, M.G.
4261
COOK, R.M.
4161*
COOKE, W.T.
4483
COOPER, R.G.
4674*
COPPER, P.H.
4712*
COPPINGER, W.R.
4354
CORDER, M.P.
4880
CORLETTE, M.B.
4801*
CORMAN, M.L.
4524*
CORTESI, N.
4442
COTTON, P.B.
4231*, 4239, 4256, 4357
COUDOUX, P.
4388
COUPLAND, G.A.E.
4365*
COUTURIER, D.
4046
COVINGTON, E.E.
4250
COWARD, D.G.
4501
COWARD, W.A.
4501, 4502
COWEN, A.E.
4913*
COWIE, A.G.A.
4810
COWLEY, D.J.
4847*
CRAIG, J.R.
4772*
CRANMER, M.
4138
CREE, I.C.
4694, 4739*
CRITCHLEY, M.
4234*
CROSS, J.H.
4916*
CROWSON, W.N.
4561
CUARON, A.
4915*
CUEVAS, P.
4844*
CULLING, C.F.A.
3966
CULP, N.W.
4880
CUMBERLAND, V.H.
4365*
CUMMINGS, J.H.
3993*
CUNHA MELO, J.R.
4048
CUNNINGHAM, H.M.
4212
CURTIS, L.E.
4339
CUSCHIERI, A.
4148
CYBULSKY, R.
3979*
D'ACOSTA, N.
4136
D'EMPAIRE, M.
4856, 4857
D'SOUZA, A.
4639
DABKE, A.T.
4791
DADINAKIS, A.
4929
DADISMAN, T.A., JR.
4836*, 4850*
DAFFNER, R.H.
4289
DAGUET, G.L.
4859
DAHLQVIST, A.
4504
DALINKA, M.K.
4458
DALSAGER, H.H.
4085
DALY, J.M.
3962
DANEK, L.
4086
DANIELS, V.G.
3988*, 3989*
DANO, P.
4922*
DARVICHE, M.
4648
DAVID, R.
4671*
DAVIDSON, W.D.
4067*
DAVIES, D.L.
4395
DAVIES, G.E.
4723
DAVIES, N.T.
3986*
DAVIS, A.E.
4756*
DAVIS, W.D., JR.
4500
DAWSON, A.M.
4191, 4419*, 4509, 4529*
DAWSON, J.L.
4777*
DE CASTRO, C.R.
4136
DE FENOS, O.M.
4136
DE FERREYRA, E.C.
4136
DE FRONZO, R.A.
4809
DE JESUS, P.O.
4327
DE LAURO, J.E.
4354
DE MAERTELAERE-LAURENT, E.
4888
DE PALMA, M.
4240
DE PRIEST, R.W., JR.
4264
DE SARAM, R.
4721
DE VITA, V.T., JR.
4228*, 4257
DEBRAY, C.
4046, 4648
DECUYPERE, J.
4215
DEDOMBAL, A.T.
4481
DEIMER, E.
4790
DEL'TSOVA, O.Y.
4218
DELAITRE, B.
4893
DELANY, H.M.
4446
DELLER, D.J.
3927*, 3928*
DELORME, G.
4682
DEMLING, L.
4082, 4259

DENK, H.
4122*, 4664*
DENOLIN-REUBENS, R.
4888
DENT, T.L.
4581
DEODHAR, S.D.
4547
DEREN, J.J.
4612
DERRINGTON, A.W.
4416*
DESAI, H.G.
4405
DESCHNER, E.E.
4178, 4467
DESCHREYER, M.
4637
DESHIMARU, M.
4686
DESJEUX, J.F.
4618, 4704*
DESNUELLE, P.
4160*
DEVAUX, M.A.
4111
DEVIK, F.
4199
DEVROEDE, G.
4056*, 4093*, 4526*
DEW, D.
4311
DEYHLE, P.
4260
DHARIA, K.M.
4573
DHUMEAUX, D.
4683, 4704*
DI MASE, J.D.
4288
DI SANT'AGNESE, P.A.
4604*
DI STASIO, G.
4727*
DIARD, F.
4682
DIAUGUSTINE, R.P.
3926*
DIAZ-FIERROS, M.
4193
DIAZ GOMEZ, M.I.
4136
DICKERSIN, G.R.
4523*
DICKIE, M.W.
4140
DICKSON, G.H.
4829
DICKSON, J.H.
4321
DIETRICHSON, O.
4769*
DIGHT, R.
4568
DILAWARI, J.B.
4328
DIMAGNO, E.P.
4603*
DINNER, M.
4586
DINOSO, V.P., JR.
4352
DIXON, M.F.
4261
DOAK, P.B.
4746
DODER, M.
3957
DOE, W.F.
4512
DOLIN, R.
3942
DOMECQ, R.
4284
DOMSCHKE, S.
4082
DOMSCHKE, W.
4082
DONDE, U.M.
4383
DONOVAN, A.J.
4029, 4699
DONY, A.
4637
DOONER, H.
4825
DORING, R.
4129
DOSCHERHOLMEN, A.
4364*, 4366*, 4409
DOXIADIS, T.
4929
DOYLE, W.F.
4399
DRAPANAS, T.
4565
DRASAR, B.S.
4422*
DREILING, D.A.
4090*, 4180
DRUM, D.E.
4281
DRYBURGH, J.R.
3963
DUBOIS, R.S.
4590*
DUBRASQUET, M.
4066*
DUDLEY, F.J.
4749, 4778*
DUDRICK, S.J.
3962
DUGA, J.
4763*
DUJARDIN, L.
4334
DUMITRESCU, M.
4245
DUMONT, M.
4150
DUNN, D.
4714*
DUNN, P.M.
4705*
DUNN, W.L.
3966
DUNPHY, J.E.
4487
DUPONT, H.L.
4633*, 4866
DURST, A.L.
4631*
DWIVEDI, M.S.
4263
DYCK, W.P.
4163*
DYER, N.H.
4509
DYMOCK, I.W.
4847*
DZIEWICKA, A.
4872
EASTWOOD, G.L.
3941, 4588*
EASTWOOD, M.A.
4421*, 4423*
ECHAVE LLANOS, J.M.
4141
ECHEVARRIA, R.A.
4771*
EDMONDSON, H.T.
4651
EDWARDS, A.J.
4851*
EDWARDS, W.M.
4768
EGAN-MITCHELL, B.
4503
EGGER, G.
4230*
EICHHOLZ, A.
3980*
EIGUER, T.
4856, 4857
EISEMAN, B.
4373*, 4677
EISEN, A.
4176
EISENBERG, M.M.
4044
EJERBLAD, S.
4293
EL-DOMEIRI, A.A.
4356
EL-SAWY, M.
4921*
ELEWAUT, A.
4334
ELGJO, K.
4673*
ELLING, P.
4737*
ELLIS, F.H., JR.
4322
ELLIS, H.
4889
ELLIS, R.B.
4188
ELSNER, B.
4685
ELVEBACK, L.R.
4587*
EMEL'IANOV, S.S.
4308

EMERY, J.L.
4681
EMMELIN, N.
4061
ENDO, M.
4379
ENGLAND, H.R.
4440
ENNIS, F.
4348
ENOMOTO, Y.
4418*
ENRILE, F.T.
4327
ENSINCK, J.W.
4837*
ERICKSON, R.P.
4121*
ERIKSON, U.
4293
ERLINGER, S.
4150, 4704*
ERMOLOV, A.S.
4308
ERY, L.
4512
ESHCHAR, J.
4680
ETLING, G.F.
4731*
EVANS, E.M.
4165*
EVANS, J.C.
4063*
EVANS, J.C.W.
4081
EWEN, S.W.B.
4485
FABER, V.
4769*
FAGIN, R.R.
4761
FAHRLANDER, H.
4909
FAIERMAN, D.
4720
FALKINBURG, N.R.
4067*
FALKSON, G.
4663*
FARA, J.
4201*
FARAH, P.
4384
FARMER, D.A.
4434
FARRELL, W.
4211
FAVARA, B.E.
4353
FEAGIN, F.
4074
FELTRIN, P.
4466
FELTS, P.W.
4627
FENOGLIO, C.M.
3930*
FERGUSON, E.F., JR.
4559
FERNANDEZ-CRUZ, L.
4606
FERNANDEZ, R.
4099*
FERON, V.J.
3970
FERRAND, J.
4384
FERRANE, J.
4683
FERRANTE, W.A.
4560
FERRARESE, S.
4240
FIELD, M.
3985*
FIELDING, J.F.
4521
FIGIEL, L.S.
4433
FIGIEL, S.J.
4433
FIGUS, A.I.
4345
FILCZEWSKI, M.
4204
FILIPOVIC, D.
4514
FILLER, R.M.
4834*
FILTZER, H.
4461
FINDLAY, J.M.
4421*, 4423*
FINDOR, J.
4284
FINE, J.
4844*
FINEBERG, C.
4498*
FINEGOLD, M.J.
4718
FIRSOVA, P.P.
4347
FISCHER, J.F.
4602*
FISCHER, L.J.
4009
FISCHER, M.G.
4715*
FLEISCH, H.A.
3977*
FLEMING, W.H.
4799*
FLEMSTROM, G.
4078
FLETCHER, W.S.
4302
FLISIAK, A.
4073, 4408
FLOCH, M.H.
4639
FOLCO, G.C.
4041
FOLEY, K.E.
3984*
FONDU, P.
4888
FORGACS, P.
4538
FORMAL, S.B.
4866
FORSTER, H.
4014
FORTEZA, M.E.
4724
FORTH, W.
4022
FORTNER, J.G.
4356
FOSTER, E.F.
4919*
FOUTS, J.R.
3926*
FOX, H.
4716*
FOX, R.A.
4778*
FRAIHA, H.
4923, 4936
FRANK, J.D.
4476*
FRANKEN, E.A., JR.
4296*
FRANKLIN, J.L.
4492*
FRANKLIN, R.H.
4312
FRASER, R.
4395
FRATER, S.I.
4288
FRAYHA, G.J.
4928
FRAZIER, H.S.
4034
FREDERICK, P.K.
3995*
FREEMAN, J.B.
4149
FREIER, S.
4513
FREIRE-MAIA, L.
4048
FRENNING, B.
3934*, 4015
FRETER, R.
3943
FREUND, H.
4784
FREY, C.F.
4660
FRIEDMAN, E.W.
4870, 4871
FRIEDMAN, H.I.
3929*
FROMM, D.
3982*, 4445
FROST, C.C.
3937
FRY, I.K.
4291
FUBARA, E.S.
3943

FUCHS, W.A.
4235*
FUJIMOTO, A.
4300
FUJIMOTO, J.M.
4008
FUJINO, T.
4031
FUJITA, M.
4208
FUJIWARA, Y.
4912
FUKUMI, H.
4413*
FULLEN, W.D.
4800*
FUNG, W.P.
4597
FURUTA, Y.
4101
FUSILLO, M.H.
4186
GABBER, H.J.
4850*
GABRIELSSON, N.
4553
GAEDE, J.T.
4653
GAISFORD, W.D.
4532
GALAMBOS, J.T.
4855*
GALLACHER, M.
4030
GALLAGHER, N.D.
3984*, 4887
GAMAL, Y.E.
4920*
GAMMAGE, D.
4074
GANG, H.
4123*
GANGAROSA, E.J.
4866
GARBER, H.J.
4836*
GARCIA CARDO, A.
4431, 4853*
GARCIA, L.
4269
GARDNER, B.
4794*, 4797*
GARG, B.D.
3948
GARVEY, J.W.
4446
GAS, N.
4185
GASBARRINI, G.
4757*
GAULT, M.H.
4741
GAYA, H.
4203*
GAZZANIGA, A.B.
4426
GEDDES, E.W.
4663*
GELMAN-MALACHI, E.
4494*
GENEIX, A.
3955
GENTIL, A.
4184
GEOFFROY, H.
4388
GEORGAKAKIS, A.
4255
GEORGE, F.W., III
4620
GERBER, M.A.
4664*
GERSON, C.D.
4475*
GERTZ, T.C.
4591*
GEUZE, J.J.
4095*
GHADIMI, H.
4507
GHANEM, M.
4438
GHANEM, M.H.
4921*
GHAVAMI, A.G.
4728*
GHAZZAWI, O.
4896
GHIDINI, G.
4442
GHOSH, M.L.
4681
GHOSH, S.
4942
GIBB, S.P.
4285
GIBERTINI, G., JR.
4442
GILAT, T.
4494*
GILDAY, D.L.
4229*
GILDENHORN, H.
4692
GILES, J.P.
4738*
GILLER, J.
3987*
GILLESPIE, W.J.
4636
GILLIES, C.G.
3945
GIORGINI, G.L., JR.
4077
GIRGIS, M.
4763*
GJONE, E.
4673*, 4760*
GJORSTRUP, P.
4061
GLASGOW, J.F.T.
4770*
GLASGOW, M.S.
4172
GLASS, G.B.J.
3924*, 4062*, 4069*
GLASS, J.L.
4593
GLEW, R.H.
4043
GLUCK, M.
4318
GLUSHEVITZKY-STRACHMAN, D.
4171
GO, V.L.W.
4094*, 4603*, 4852*
GOCKE, D.J.
4748
GODQUIN, B.
4877
GOEL, K.M.
4598
GOERTZ, J.
4773*
GOLD, J.
4861
GOLDBERG, H.I.
4548
GOLDBLATT, P.J.
3945
GOLDEN, G.T.
4796*, 4826
GOLDFARB, S.
4687
GOLDSMITH, H.S.
4697, 4698
GOLDSMITH, R.E.
4800*
GOLDSTEIN, F.
4498*
GOLDSTEIN, G.B.
4754*
GOLDSTEIN, M.J.
4467
GOMERCIC, H.
3951
GOMPERTZ, D.
4203*
GOODALE, R.L., JR.
4438, 4830
GOODMAN, A.A.
4375
GOODNER, J.T.
4326
GORBACH, S.
4900
GORDON, E.E.
4763*
GORDON, F.
4915*
GORDON, H.
4692
GORDON, I.
4732*
GORINI, S.
4144
GORNY, D.
4073, 4088, 4408
GOTLIN, R.W.
4590*
GOUGH, K.R.
4477*
GOUIN, B.
4648

GOYAL, R.K.
4658
GRABNER, G.
4119*
GRACEY, M.
4886
GRADY, G.F.
4178
GRAHAM, G.G.
4516
GRAHAM, N.G.
4645
GRAIVIER, L.
4351
GRAND, R.J.
4162*
GRANEY, D.O.
3938
GRANQVIST, S.
4553
GRANT, A.K.
4416*
GRANT, B.D.
4452
GRASSI, G.
4387
GRASSI, G.B., JR.
4359
GRASSMANN, E.
3983*
GRAY, L.A.
4567
GRECO, M.A.
4718
GREEN, G.M.
4097*
GREEN, M.L.
4059*
GREEN, N.
4620
GREENE, J.F., JR.
4399
GREENE, K.R.
4100*
GREENHALF, J.O.
4873
GREENWAY, C.V.
4202*
GREGG, J.A.
4252
GREGORIADIS, G.
4665*
GREIM, H.A.
4122*
GRELET, P.
4682
GRELLET, J.
4683
GRIFFIN, J.L.
4531*
GROSS, A.
4318
GROSSMAN, R.
4635
GROTH, C.G.
4631*
GROTSKY, H.W.
4468
GROVUM, W.L.
4050
GRUNER, H.J.
4270
GUARDIONE, V.A.
4362*
GUIRGIS, F.K.
4921*
GUIRGIS, H.
4525*
GULESSERIAN, H.P.
4662*
GULLA, P.
4155
GULLICK, H.D.
4641
GUPTA, P.S.
4945
GUPTA, R.K.
4469
GUPTA, R.N.
4269
GURVICH, A.A.
3954
GUTEILUS, J.R.
4149
GUTMAN, Y.
4171
GWINUP, G.
4426
HACKER, E.
4781*
HACKI, W.
4774*
HADDAD, J.
4542
HAESE, W.H.
4931
HAGE, G.
4111
HAGEN, S.
4199
HAGER-MALECKA, B.
4875
HAGGITT, R.C.
4486
HAGGMARK, T.
4430
HAGHIGHI, P.
4728*
HAINES, J.E.
4264
HAINES, R.S., JR.
4904
HAKAMA, M.
4350
HALGRIMSON, C.G.
4631*
HALLGREN, J.
4899
HALPERN, A.
4774*
HALSTED, C.H.
4493*
HALTER, F.
4599
HAMAMOTO, K.
4236*
HAMBER, G.
4389
HAMMERSGAARD, E.A.
4530*
HANCEVIC, J.
4374
HANNINEN, O.
4197
HANO, J.
4084
HANSELL, J.
4612
HANSKY, J.
4365*
HARA, K.
4540
HARDMAN, H.F.
4052
HARDOUIN, J.P.
4648
HARDY, R.N.
3988*, 3989*, 4000
HARINASUTA, U.
4745
HARRIES, J.T.
4489*
HARRINGTON, P.R.
4321
HARRISON, R.C.
4391, 4392, 4450
HARTZ, C.R.
4425
HARVEY, W.C.
4904
HASAN, N.
4578
HASEN, J.
4471
HASHIDA, Y.
4539
HASHIMOTO, K.
4101
HASSAN, R.
4920*
HASSINEN, I.
4668*
HAUGHTON, V.
4820
HAVIA, T.
4478
HAY, R.W.
4520
HAYES, J.R.
4127
HAYES, M.A.
4628*
HAYNES, S.
4811
HEAL, A.V.
4725*
HEAP, T.R.
4378
HEATH, T.J.
4113
HEATON, K.W.
4012
HEFTI, M.
4474

HEKMAT, K.
4728*
HELLER, F.
4813
HELLSTROM, K.
4011
HENDERICKX, H.K.
4215
HENDERSON, G.I.
4131
HENDERSON, L.M.
3946
HENDERSON, R.D.
4307
HENGST, W.
4243
HERBERT, V.
3975*, 4108
HERBERTSON, B.
4666*
HERCZ, A.
4770*
HERINGOVA, A.
4709
HERISHANU, Y.
4707
HERMANN, A.H.
4118*
HERMODSSON, S.
4729*
HERMON-TAYLOR, J.
4625
HERRING, B.D.
4693
HERRINGTON, J.L., JR.
4393
HERSH, T.
4615, 4658
HERZBERG, G.R.
3981*
HIETANEN, E.
4197
HIGUCHI, W.I.
4816
HIKITA, H.
4047
HILDEN, M.
4765*
HILL, M.
4764*
HILLEMAN, M.R.
4740*
HILLENBRAND, P.
4802*
HILLIARD, J.
4764*
HINCHEY, E.J.
4447
HINDER, R.A.
4079
HINES, C., JR.
4500
HIRANO, U.
4402
HIROTA, T.
4346
HIRSCH, E.F.
4339
HIRSCHHORN, N.
4034
HJELMQUIST, U.B.
4075
HOELDTKE, R.D.
4515
HOFBRAND, A.V.
4512
HOFMANN, A.F.
4120*, 4491*, 4806*
HOLBOROW, E.J.
4512
HOLE, D.
3925*
HOLFORD, M.
4416*
HOLGATE, S.T.
4885
HOLMES, W.C.
4651
HOLMQUEST, D.
4282
HOLTERMULLER, K.H.
4852*
HOLTZAPPLE, P.
4176
HOLTZAPPLE, P.G.
3944
HOLUBITSKY, I.B.
4391, 4392
HONJYO, I.
4236*
HOPKINS, G.B.
4550
HORAK, W.
4119*
HORN, D.B.
4423*
HORNE, C.H.W.
4780*
HORNICK, R.B.
4866
HORNYCH, A.
3978*
HORSLEY, J.S., III
4826
HORST, H.
4751
HORTON, B.J.
4687
HOSHINO, T.
4340
HOSHINO, Y.
4678
HOUSTON, C.H.
4559
HOWARD, D.R.
4470
HOWARD, J.
3997
HOWARD, J.M.
4630*
HOWARD, R.B.
4132
HOWAT, H.T.
4234*
HOYT, R.
4768
HOYUMPA, A.M., JR
4131
HUAN, P.H.
3998
HUANG, S.N.
4741
HUANG, T.Y.
4414*
HUBSCHER, G.
4188
HUCHZERMEYER, H.
4305
HUECKEL, H.J.
4447
HUGHES, E.S.R.
4583
HUGHES, H.M.
4780*
HUGHES, J.
4669*
HUGHES, M.
4716*
HUGHES, M.K.
4186
HUGON, J.S.
4093*, 4177
HUIZENGA, K.A.
4587*
HUNG, L.V.
3998
HUNT, J.N.
4070*
HUNTER, J.O.
4705*
HUNTER, M.T.
4425
HUTH, K.
4654
HUTTERER, F.
4122*
HYNIE, I.
4174
IANNUCCILLI, E.
4077
IBER, F.L.
4638
IMAI, C.
4884
IMASATO, K.
3936
INATOMI, N.
4054
IRONSIDE, A.
4901
ISENBERG, J.I.
4025*, 4037
ISHIKAWA, S.
4010
ISLAM, A.
4788
ISLAM, M.N.
4736*
ISLAM, N.
4788
ISSELBACHER, K.J.
4169*
ITO, G.
4614

ITO, H.
4884
ITO, Y.
4038
ITTEL, M.E.
3956
ITTENSOHN, O.L.
4740*
IWARSON, S.
4726*, 4729*
IWATSUKI, K.
4101
IWEZE, F.I.
4312
IZAKA, K.I.
4002
JACOBS, A.
3939, 3997
JACOBS, E.
4390
JACOBS, S.
4720
JACOBSON, J.
4701*
JACOBSON, Y.G.
4441
JAGELMAN, D.G.
4889
JAGIC, H.
4935
JAKSINA, S.
4162*
JAKUBOWSKA, K.
4244
JANOWITZ, H.D.
4475*
JAQUES, L.B.
3996*
JARA, R.
4825
JARNUM, S.
4759*
JASINSKI, W.K.
4283
JAUREGUI, E.M.
4685
JEANS, W.D.
4546
JEDRYCHOWSKI, A.
4802*
JEEJEEBHOY, K.N.
4846*
JEN, G.
4916*
JENKINS, L.B.
4653
JENSEN, E.
4361
JIMENEZ, J.P.
4289
JIRSA, M.
4709
JIRSOVA, V.
4709
JOB, H.
4354
JOELSSON, I.
4429
JOFFE, N.
4552
JOHANSEN, T.S.
4330
JOHANSSON, C.
4371*
JOHANSSON, H.
4293
JOHNSON, A.H.
4876
JOHNSON, J.D.
4183
JOHNSON, L.
4179
JOHNSON, R.E.
4228*, 4257
JOHNSON, W.D., JR.
4146
JOHNSTON, D.I.
4100*
JOHNSTON, G.S.
4228*
JOHNSTONE, F.R.C.
4391
JOINER, P.D.
4039
JONES, E.L.
4407
JONES, G.M.
4182
JORDAN, P.H., JR.
4323
JORGE, A.D.
4332*
JORIS, I.
3940
JOSHI, V.R.
4944
JOUBERT, S.M.
4905
JOYSEY, V.
4666*
JUHL, E.
4765*
JUSSILA, J.
4490*
JUSTINIANI, F.R.
4675
JUTTIJUDATA, P.
4775*, 4776*
KABEYA-MUDIAY, S.
4888
KABIR, M.
4443
KAGAYAMA, M.
4220
KAHONEN, M.T.
4668*
KAKIS, G.
3992*
KAKIZAKI, G.
4912
KALTIALA, E.H.
3952
KAMADA, T.
4730*
KAMATH, S.K.
4194
KAMHOLZ, S.L.
4541
KAMINSKI, D.L.
4153, 4533
KANEKO, K.
3935
KANIEWSKA, A.
4360
KAPLAN, A.R.
4525*
KAPLAN, E.L.
4852*
KAPLAN, M.
4781*
KAPLAN, S.
4318
KAPOOR, O.P.
4944
KAPPELMAN, M.
4565
KAPUR, B.M.L.
4469
KARAHARJU, E.O.
4435
KARK, A.E.
4180
KARLSTROM, P.
4293
KARMANSKA, W.
3958
KARMANSKI, J.
3958
KARREMAN, G.
4080
KASSELL, B.
4103
KASUGAI, T.
4276
KATER, L.
4695
KATZ, D.
4274
KATZ, J.S.
4939
KATZ, S.
4336
KAUFMAN, S.
4226*
KAWAI, B.
4300
KAWAI, K.
4208, 4381
KAWANO, T.
4002
KAWASAKI, H.
3936
KAY, A.W.
4394
KAY, J.
4103
KAYE, G.I.
3930*
KAYNAN, A.
4090*, 4180
KEANE, P.M.
4269
KEATS, T.E.
3971

KEEFER, R.C.
4125
KEELING, J.W.
4489*
KEIGHLEY, M.R.B.
4645
KELLER, R.J.
4369*
KELLY, J.
4902
ELLY, T.R.
4114*
ELTNER, R.M.
4533
ENDALL, S.R.
4121*
ENNEDY, A.
4427
ENNEDY, F.
4394
ENNEDY, J.T.
4583
ENT, J.R.
4764*
ENT, T.H.
4009, 4026*
EPKAY, D.L.
4805*
ERN, F., JR.
4417*
ERR, N.W.
4485
ERREMANS, R.
4032
ESSLER, J.I.
4230*
ETYI, I.
4878
EUSCH, G.
4881
EUSCH, G.T.
4178
EW, M.C.
4752
HAN, M.A.
4791
HAW, K.T.
4835*
KHILNANI, M.T.
4369*
HO, K.M.
4597
HOURY, K.
4384
HU, E.G.
4434
IDDER, G.W.
4064*
IDO, R.
4181
IM, U.S.
4480
IM, Y.S.
4065*, 4168*, 4311
IMMICH, G.A.
4020
IMOTO, E.
3936

KIMURA, C.
4540
KING, D.R.
4841*
KINGSTON, M.E.
4898
KINLAW, J.B.
4140
KINO, I.
4862
KINOSHITA, Y.
4614
KINYANJUI, H.
4941
KINZIE, J.L.
4190
KIPNIS, D.M.
4902
KIRCHGESSNER, M.
3983*
KIRK, P.R.
3967
KIRKPATRICK, J.A.
4815
KIRKPATRICK, J.R.
4534
KISAKA, Y.
4540
KITAZIMA, M.
4678
KLAASSEN, C.D.
4137
KLEBANOFF, G.
4733*
KLEIN, M.S.
4336, 4348
KLEIN, P.D.
4120*
KLEIN, R.L.
4114*
KLEINMAN, M.S.
4272
KLING, S.
4396
KLIPSTEIN, F.A.
4488*
KNAPPER, W.H.
4356
KNOX, M.T.
4070*
KNUDSEN, E.
4530*
KNUST, F.J.
4506
KOAMI, E.
4614
KOBAYASHI, K.
3969
KOBAYASHI, S.
4271, 4276, 4300
KOBAYASHI, Y.
4884
KODESCH, R.
4633*
KOHLER, R.
4253
KOHLI, Y.
4381

KOHLMANN, F.W.
4933
KOIVUNIEMI, A.
4254
KOIZUMI, T.
4730*
KOLDOVSKY, O.
4176
KOLMANIC, P.
4455
KOLODEJ, A.
4006
KONSTANTINIDIS, I.
4751
KONTUREK, S.
4104
KONTUREK, S.J.
4057*
KONYAR, E.
4684
KOOHDARY, A.
4535
KORELITZ, B.I.
4527*, 4593
KOREPANOV, V.I.
4708
KORMAN, M.G.
4365*
KORNHALL, S.
4838*
KORZON, M.
4872
KOSAKA, T.
4236*
KOTTKE, B.A.
4058*
KOTZ, A.
4868
KOUDAHL, G.
4333
KOVACS, K.
3948
KOVNAT, P.J.
4518
KOWALCZYK, W.
4204
KOWALEWSKI, K.
4006, 4071*
KRAG, E.
4085
KRAIN, L.S.
4608
KRAJ, M.
4743
KRARUP, N.
4143
KRASILNIKOFF, P.A.
4591*
KRAUSE, U.
4293
KREEL, L.
4292
KREMER, D.
4395
KREUZER, W.
4785
KRIPPAEHNE, K.W.
4264

KRISTENSEN, K.A.B.
4550
KROMANN, N.
4361
KRONBORG, O.
4406
KRUGMAN, S.
4738*
KRUSH, A.J.
4525*
KRUZIC, A.
4374
KUENZLE, C.C.
4207
KUHNE, J.
4933
KUKSIS, A.
3992*
KUMAR, P.J.
4419*
KUMAR, S.
4507
KURIYAMA, H.
4038
KUSHNER, D.S.
4675
KUSTER, G.G.R.
4128, 4719
KUTZNER, J.
4607
KUZIO, M.
4420*
KUZNIARZ, K.
4875
LAGUNDOYE, S.B.
4925
LAINSON, R.
4923, 4936
LAISSUE, J.
4774*
LAL, S.
4741
LAM, K.C.
4754*
LAMBERT, M.J., III
4782*
LANCIAULT, G.
4080
LANDA, L.
4915*
LANDSEY, E.S.
4565
LANE, D.
4577
LANE, N.
3930*
LANGER, B.
4303
LANGEVIN, M.L.
3932*
LANGLEY, D.J.
4736*
LANIER, V.C., JR.
4908
LAPAURI, D.A.
4087
LARROUDE, C.
4682
LARSON, S.M.
4228*
LASNE, C.
4184
LATTES, R.
4862
LAUFER, I.
4552
LAUNOIS, J.P.
4649
LAUTRE, G.
4386
LAUWERS, W.
4764*
LAVY, S.
4707
LAWS, J.W.
4777*
LAWTON, R.L.
4662*
LEBEL, J.S.
4547
LEBLANC, L.
4241
LECHIN, F.
4142
LEDUC, L.P.
4077
LEE, G.R.
4670*
LEE, H.K.
4288
LEE, J.C.
4132
LEE, M.R.
4851*
LEE, P.
4569
LEE, S.K.
4597
LEEDHAM, P.W.
4440
LEGER, L.
4893
LEGOFF, P.
4051
LEHRMANN, C.
4196
LEHY, T.
4066*
LEMPINEN, M.
4254, 4677
LEONARD, H.S.D.
4873
LEONARDS, J.R.
4863
LERNER, J.
3981*
LESCH, R.
4793
LESSER, P.B.
4706
LEVER, A.F.
4395
LEVIN, D.L.
4600*
LEVIN, S.E.
4939
LEVINE, G.
4353
LEVINE, M.M.
4866
LEVINE, R.
4692
LEVINE, S.
4519
LEVISON, H.
4770*
LEVTOVA, K.Z.
4865
LEVY, C.
4649
LEVY, G.
4863
LEVY, L.J.
4763*
LEWICKI, A.M.
4451, 4821
LEWICKI, A.W.
4820
LEWICKI, F.X.
4821
LEWIN, M.
4066*
LEWIN, M.R.
4847*, 4890
LEWIS, C.
4703*
LEWIS, D.L.
4428
LEWIS, K.O.
4667*
LEWIS, M.I.
4551
LEYSSAC, P.P.
4017
LIAVAG, I.
4372*
LIBONATI, J.P.
4866
LICASTRO, R.
4431, 4853*
LICHT, A.
4784
LIDDELOW, A.G.
4756*
LIEBER, C.S.
4123*
LIEDBERG, G.
3972
LIMLOMWONGSE, L.
4072*
LIN, J.B.
4601*
LIN, P.S.
4463
LIN, T.Y.
4679
LINCK, P.L.
4386
LINDENAUER, S.M.
4581, 4832
LINDENBAUM, J.
4511
LINDER, B.
4899

LINDHOLM, A.
4726*
LINDSAY, M.K.
4569
LINDSKOG, B.I.
4823
LINTRUP, J.
4361
LIPSHUTZ, W.
4294*
LIPSITZ, P.J.
4280
LISE, M.
4466
LITTLE, S.A.
4055*
LITVINOV, V.I.
4308
LLEWELLIN, J.M.
4059*
LLOYD-STILL, J.D.
4834*, 4835*
LO GUZZO, R.
4359
LOBLEY, C.R.
4855*
LOCHER, G.W.
4609
LOCHER, J.T.
4249
LONDON, M.
4280
LONGHI, E.H.
4323
LONGMIRE, W.P., JR.
4617
LONZANO, I.
4193
LOOBY, W.E.
4320
LORBER, S.H.
4352
LOU, T.Y.
4883
LOUVARD, D.
4160*
LOVE, A.H.G.
4019
LOW-BEER, T.S.
4803*
LUBBERS, E.J.C.
4465
LUCAS, C.E.
4133
LUDWIG, J.
4719
LUND, H.T.
4701*
LUND, J.O.
4575
LUNDERQUIST, A.
4838*
LUNDGREN, O.
4201*, 4205
LUNDIN, P.
4726*, 4729*
LUNN, P.G.
4520
LUNZER, M.
4779*
LUPPA, D.
4016
LURIE, B.
4864
LUTSCH, G.
3950
LUTTWAK, E.M.
4784
LYMAN, R.L.
4097*
LYNCH, H.T.
4525*
LYNCH, J.
4525*
LYNCH, M.J.
4770*
LYNCH, R.E.
4670*
MACHADO, M.
4631*
MACKAY, C.
4394
MACKAY, I.R.
4337
MACKENNA, B.R.
4030
MACKENZIE, G.W.
4449
MACKIE, D.B.
4811
MACLEAN, L.D.
4741
MACMAHON, A.G.
4767
MACRAE, I.
4594
MACSWEEN, R.N.M.
4780*
MADDREY, W.C.
4809
MADER, A.
4474
MADGE, G.E.
4700
MAESTRACCI, D.
4177
MAGALHAES, A.F.
4512
MAGAREY, J.R.
4416*
MAGARIBUCHI, T.
4038
MAGLIULO, E.
4144
MAGNIUS, L.
4726*
MAHGOUB, S.E.
4920*
MAHMUD, K.
4364*
MAHOUR, G.H.
4860
MAIO, G.
4727*
MAJNO, G.
3940
MAKULU, D.R.
4170
MALAGELADA, J.R.
4094*
MALEK, G.
4554
MALINOWSKA, K.W.
3988*, 3989*, 4000
MALIUGINA, T.A.
4818
MALLORY, A.
4417*
MANA, E.
4724
MANCINI, H.W.N.
4573
MANDEL, P.
3956
MANITTO, P.
4152
MANSBACH, C.M., II
4156*
MARASSO, F.
4692
MARCO, J.
4193
MARGOLIS, S.
4629*
MARIA, T.A.
4048
MARIANI, C.
4766
MARIANI, G.
4358
MARINO, A.W.M., JR.
4573
MARKS, G.
4574, 4585
MARKS, I.N.
4367*
MARKS, N.
4842*
MARKS, R.
4419*
MAROUX, S.
4160*
MARSHALL, R.M.
4033
MARTEAU, J.
4543
MARTIN, D.C.
4426
MARTIN, F.
4242, 4528*
MARTIN, G.A.
4163*
MARTIN, L.K.
4917*, 4918*
MARTIN, M.S.
4528*
MARTIN, W.J.
4058*
MARZANO, L.A.
4727*
MARZI, M.
4359
MASLENNYKOVA, L.D.
4218

MASON, R.
3984*
MASSEYEFF, R.
4241
MASUDA, M.
4540
MASUR, R.
4794*
MATERN, D.I.
4692
MATHUR, P.S.
4791
MATSUKI, S.
4678
MATSUZAWA, T.
3960
MATTHEWS, G.
4097*
MATTILA, M.J.
4490*
MATUSOVITS, E.
4878
MAURER, W.
4609
MAY, H.
4403
MAY, R.E.
4811
MAYER, R.J.
4182, 4188
MAYSTON, P.D.
4092*
MAYUMI, M.
4755*
MAZAL, S.
4707
MAZUMDER, D.N.G.
4510
MAZUR, J.M.
4407
MCCARTHY, C.F.
4503
MCCARTHY, D.M.
4168*
MCCAUGHAN, J.J., JR.
4561
MCGINNIS, J.
4099*
MCGLONE, F.B.
4354
MCHARDY, G.
4309
MCHATTIE, J.D.
4846*
MCKIRDY, H.C.
4030
MCLAUGHLAN, A.F.
4286
MCLOUGHLIN, M.J.
4229*
MCNAMARA, J.J.
4464
MCNICHOLL, B.
4503
MCSWAIN, B.
4908
MCSWEENEY, W.J.
4874
MCWILLIAMS, N.
4351
MEARRICK, P.T.
4004
MEERKREEBS, G.
4692
MEHLMAN, C.S.
4068*
MEHTA, J.M.
4383
MEISSNER, W.A.
4486
MEL'MAN, IU.P.
4218
MELAMED, M.R.
4467
MELBYE, R.W.
4620
MENARD, D.
4177
MENDELOFF, A.I.
4049
MERAB, A.
4384
MERVINE, T.B.
4574
METHFESSEL, A.H.
4192
MEYER-BURG, J.
4690
MEYER, E.
4014
MEYER, P.
3978*
MEYERS, M.A.
4335
MEZEY, E.
4493*
MGBODILE, M.U.K.
4127
MIALE, J.B.
4725*
MICHAELIAN, M.J.
4699
MICHALOPOULOS, S.
4634
MICHEL, R.L.
4470
MIERAU, G.
4353
MIKATA, A.
4678
MIKOLAJKOW, A.
4283
MIKULECKY, M.
4135
MILDER, M.S.
4228*
MILIKOW, E.
4287
MILLER, A.
4715*
MILLER, H.
4671*
MILLER, J.
3976*
MILLER, M.J.
4919*
MILLER, W.
4294*
MILLIEZ, P.
3978*
MILLIGAN, J.
4778*
MILLS, G.L.
4216
MILTON-THOMPSON, G.J.
3993*
MINOLI, L.
4144
MISAKI, F.
4381
MISIEWICZ, J.J.
3993*, 4328
MISRA, M.K.
4582
MISRA, P.
4519
MISRA, R.C.
4945
MISTERKA, S.
4329
MISTERKA, W.
4329
MISTILIS, S.P.
4117*, 4754*
MITCHELL, W.D.
4421*, 4423*
MITRA, R.
4510
MITROVA, E.
4102
MIWA, T.
4273, 4346
MIYAKAWA, K.
4686
MIYAKAWA, T.
4686
MOALLEM, S.
4318
MOERTEL, C.G.
4892
MOFFAT, A.J.
4780*
MOHANRAM, M.
4576
MOINUDDIN, M.D.
4741
MOISEY, C.U.
4545
MOLENDA, J.R.
4836*, 4850*
MOLINO, D.
4828
MOMTAZI, S.
3975*
MONGA, G.
3973
MONTAS, S.
4488*
MONTASIR, A.
4437
MONTEIRO, E.H.
4597
MONTGOMERY, R.D.
4508

MONTI, D.
4152
MOOG, F.
4161*
MOORE, E.J.
4043
MOORHOUSE, E.C.
4211
MORELL, A.G.
4665*
MORELLO, D.C.
4815
MORGAN, D.B.
3977*
MORGENSTERN, L.
4237
MORIN, C.L.
4618
MORISHITA, T.
4413*, 4418*
MORITA, A.
4413*, 4418*
MORITZ, E.
4785
MORRIS, J.G.
4286
MORRIS, J.L.
4004
MORRISSEY, J.F.
4554
MORSON, B.C.
4555
MOSES, M.L.
4585
MOSHAL, M.G.
4386
MOSKOWITZ, H.
4287
MOSLER, D.
4243
MOSS, A.A.
4548
MOSSINI, F.
4076
MOSTOSKY, U.V.
4470
MOTOI, M.
4479
MOTT, G.E.
4687
MOULE, Y.
3964
MOULLE, P.
4893
MOZES, M.
4798*
MUKAI, T.
4236*
MUKHERJEE, A.K.
4940
MUKOSE, Y.
4340
MULLEN, J.L.
4635
MULLER, F.
4016
MUNDAY, K.A.
3986*
MUNOZ, R.
4915*
MURAYAMA, E.
4686
MURRAY, G.F.
4809
MURRAY-LYON, I.M.
4758*, 4777*
MURTHY, V.S.
4202*
MUSTAFA, S.J.
4610
MUSTALA, O.O.
4676
MUSTAPHA, T.
4471
MUTCHLER, J.H.W.
4655
MUTO, T.
4555
MUTOH, Y.
4346
MYLOTTE, M.
4503
MYREN, J.
4854*
NAEIM, F.
4712*
NAGAMINE, S.
4540
NAHRWOLD, D.L.
4153
NAJARIAN, J.S.
4830
NAKAJIMA, T.
4601*
NAKAO, M.
4208
NAKAYAMA, F.
4795*
NAKAYAMA, K.
3936, 4300
NAN, A.K.
4341
NANCE, F.
4566
NANDI, P.
4510
NARDI, G.L.
4110
NASCA, S.
4066*
NATHANIELSZ, P.W.
3988*, 4000
NAVAB, F.
4272
NAYER, H.R.
4715*
NAYLOR, M.C.
4058*
NEBEL, O.T.
4297*
NELL, G.
4022
NELSON, R.
4836*, 4850*
NERI, V.
4240
NESIS, L.
4221
NEWBERRY, W.M.
4688
NEWMAN, A.
3993*
NEWMAN, J.
4029
NEWMAN, J.H.
4546
NEWMAN, S.P.
4779*
NGO, N.L.
4573
NICE, C.M., JR.
4560
NIELSEN, J.O.
4737*
NIELSEN, K.C.
3972
NIELSEN, M.H.
4737*
NIKKAKU, T.
4479
NISHIKI, T.
4340
NISHINO, M.
4181
NISHIYAMA, A.
4220
NISSAN, S.
4563
NIWAYAMA, M.
4614
NOAILLAC-DEPEYRE, J.
4185
NOGUCHI, T.
3932*, 4181
NORDENFELT, E.
4750
NORDMANN, J.
4124*
NORDMANN, R.
4124*
NORDOY, A.
4760*
NORMANN, S.J.
4222
NORTH, J.D.K.
4746
NORTHFIELD, T.C.
4422*, 4806*
NORTON, L.
4373*
NOTHMANN, B.J.
4432
NOTO, N.
4912
NOVIS, B.
4864
NOVIS, B.H.
4367*, 4842*
NOWICKA, A.
4204
NUNLEY, W.C.
4140
NUNN, P.N.
4391

NUNNERLEY, H.B.
4777*
NYHUS, L.M.
4310, 4325
O'BRIEN, T.K.
4837*
O'DOHERTY, P.J.
3992*
O'DONNELL, J.M.
4001
O'GRADY, F.
4191, 4529*
O'GRADY, J.F.
4535
O'KEEFE, D.D.
4524*
O'SHEA, M.J.
4749
O'SULLIVAN, W.D.
4437
OATES, M.D.G.
4344
OBTULOWICZ, W.
4057*, 4104
OCHSENFAHRT, H.
3990*
OCHSNER, J.L.
4315
OCKNER, R.K.
4117*
OEHLER, G.
4654
OGAWA, K.
4479
OGUNBA, O.
4926
OHASHI, M.
4413*
OHBAYASHI, A.
4755*
OHLSEN, H.
4553
OHLSSON, K.
4657
OHNISHI, T.
3965
OHTAKE, H.
4340
OIZUMI, T.
4912
OKOCHI, K.
4755*
OKURA, J.
4301
OLATUNBOSUN, D.A.
4499
OLDER, A.
3945
OLDS, B.A.
4097*
OLKKONEN, L.
4556
OLSEN, A.M.
4316
OLSEN, J.
4922*
OLSON, K.N.
4714*
OLSON, L.C.
4744, 4745
OLSON, R.E.
4744
OMATA, S.
3965
ONG, G.B.
4313
OPPENHEIM, F.G.
4214
ORD, M.G.
4145
ORECCHIA, C.
4387
ORR, W.
4664*
OSBORNE, M.P.
4375
OSHIMA, H.
4400
OSMUN, G.P.
4287
OSTERGAARD KRISTENSEN, L.
4017
OSTROWITZ, A.
4794*
OTTENBERG, D.
4352
OTTENJANN, R.
4270
OTTO, P.
4305
OUDEA, M.C.
3953
OUDEA, P.
3953
OVERHOFF, H.
4022
OWEN, G.M.
4412
OWEN-SMITH, M.S.
4312
OWENS, M.P.
4613
OWMAN, C.
3972
OZER, H.
3933*
PAIGE, D.M.
4516
PALASCIANO, G.
4111
PALMER, E.D.
4858
PALMIERI, A.J.
4460
PANISH, J.
4237
PANNACCIULLI, I.
3957
PANOUSIS, P.
4634
PANTZAR, P.
4254
PANUSH, R.S.
4761
PAPALEXANDRIS, N.M.
4428
PARAGAS, P.D., JR.
4845*
PARBHOO, S.P.
4802*
PARK, N.
4191
PARK, O.J.
3946
PARKS, A.G.
4568
PARKS, T.G.
4042
PARLOW, A.F.
4764*
PARSONS, B.J.
3986*
PASCAL, J.P.
4659
PASCAL, R.R.
3930*
PASSWELL, J.
4671*
PATRICK, A.
4403
PATTERSON, J.F.
4523*
PATTI, J.
4794*
PAULINO, G.B., JR.
4914*
PAUMGARTNER, G.
4119*
PAYNE, J.V.
4903
PAYNE, W.S.
4316
PEARSE, A.G.E.
4420*, 4847*
PEARSON, F.G.
4307
PEDRAZZOLI, S.
4466
PEDRINIS, E.
4907
PELKONEN, P.
4496*
PELLICCIA, O.
4434
PELLONI, R.R.
4207
PENA, A.S.
4497*
PENA, F.
4142
PENARDI, R.
4764*
PENGELLY, C.D.R.
4619
PENN, I.
4631*
PENNINCKX, F.
4032
PENNINGTON, D.G.
4565
PENNOIT, H.
4334
PENTIKAINEN, L.A.
4676

PEOPLES, A.
4138
PERA, C.
4606
PERFILYEVA, E.B.
4865
PERGOLA, F.
4543
PERISSEL, B.
3955
PERKINS, W.E.
4411
PERLMAN, M.M.
4424*
PERMUTT, M.A.
4902
PERRAULT, J.
4056*
PERSSON, C.G.A.
4024*, 4036
PERUMAL, J.R.A.
4934
PESCH, L.A.
4132
PETEREIT, M.F.
4472
PETERS, R.L.
4772*
PETERSEN, H.
4096*, 4372*
PETERSEN, O.H.
4219
PETERSON, H.
4854*
PETERSON, R.E.
4008
PETRUKHYN, V.Y.
4218
PETTIT, H.S.
4319, 4653
PFEIFER, U.
3949
PHILLIPS, R.G.
4354
PHILLIPS, S.F.
3987*
PIAZZA, M.
4727*
PICK, R.
4731*
PIMPARKAR, B.D.
4383
PINELLI, A.
4134
PINKUS, G.S.
4582
PINN, V.
4110
PIPER, D.W.
4378
PISARSKI, A.
3958
PISSIDIS, A.
4634*
PISSIOTIS, C.A.
4632*
PITCHUMONI, C.S.
4517
PITOT, H.C.
4687
PITT, H.A.
4146
PLAA, G.L.
4147
PLESKO, N.
4374
POHOWALLA, J.N.
4263
POLAK, J.M.
4420*, 4847*
POLEY, J.R.
4491*
POLLARD, R.J.
4536
POMARE, E.W.
4803*
PONTEFRACT, R.D.
4212
POOLE, D.
4867
POON, R.
4805*
POORT, C.
4095*
POPESCU, S.
3961
POPIELA, T.
4401
POPPENHAUSEN, R.B.
4117*
POPPER, H.
4122*, 4664*
PORTER, P.
3931*
POTTER, B.M.
4874
POULAKOS, L.
4026*
POULSEN, E.
4210
POULSEN, H.
4769*
POWELL, J.R.
4733*
POWELL, P.M.
4161*
POZNANSKI, A.
4558
PRAKASH, O.
4942
PRAKONGPAN, S.
4816
PRATT-THOMAS, H.R.
4653
PRAZICH, J.
4808*
PRECHT, K.
4747
PREISIG, R.
4235*, 4774*
PRESCOTT, R.J.
4423*
PRINCE, A.M.
4731*
PRINGOT, J.
4390
PROCTER, D.S.C.
4306
PROVOST, P.J.
4740*
PROZESKY, O.W.
4742
PUENTE, S.
4825
PUGH, R.N.H.
4777*
PUGLISI, L.
4041
PUNYAGUPTA, S.
4745
PURDON, R.A.
4027*
PUTNAM, C.W.
4631*
PYRTEK, L.J.
4338
QUARLES, R.H.
4172
QURESHI, Z.A.
4619
RAF, L.
4429
RAHBEK, I.
4361
RAHMAN, M.
4444
RAJAPAKSE, C.N.A.
4721
RAM, M.D.
4463
RAMA RAO, P.B.
4187
RAMACHANDRAN, S.
4721, 4934
RAMBO, W.M.
4839*
RAMSOE, K.
4759*
RANDALL, H.T.
4883
RANEK, L.
4672*, 4759*
RANNIKKO, S.
4435
RANSHAW J.
4200
RAO, K.R.
4223
RAO, L.M.
4320
RASANEN, O.
3952
RASK-MADSEN, J.
4530*, 4575, 4580
RATLIFF, C.R.
4163*
RAUSH, N.
4868
RAUSS, K.
4878
RAY, J.F., III
4318
RAYL, J.E.
4040

READ, A.E.
4233*
REDDY, K.D.
4265
REDDY, V.
4576
REDEKER, A.G.
4732*, 4734*
REDINGER, R.N.
4118*
REEDER, D.D.
4063*, 4075, 4081
REEVES, G.
4110
REHFELD, J.F.
4765*, 4848*
REHFIELD, J.F.
4246
REHMAN, A.
4320
REID, P.E.
3966
REIF, L.
4680
REISER, S.
3991*, 3995*, 4158*, 4159*
RELLER, L.B.
4735*
REMKE, H.
4016
REMMER, H.
4151
RENCORET, R.
4711
RENSING, L.
4129
RESIBOIS, A.
4684
RESIN, H.
4025*, 4037
REUTTER, W.
4793
REYNOLDS, R.C.
4052
REYNOLDS, T.B.
4772*, 4783
REZAIZADEH, K.
4728*
RHEA, J.W.
4896
RHEAULT, M.J.
4083
RHODES, J.
3925*
RIBACHENKO, P.V.
4218
RIBET, A.
4659
RIBIERE, C.
4124*
RICHARDSON, B.D.
4579
RICHARDSON, K.E.
4139
RICHART, R.M.
4862
RICHENS, E.R.
4477*
RICHMOND, V.S.
3939
RIIS, P.
4591*
RIJPSTRA, A.C.
4941
RING-LARSEN, H.
4672*
RINGWOOD, D.
4416*
RIPLEY, D.
4364*
RITCHIE, H.D.
4224
RITCHIE, J.
4537
RITLAND, S.
4673*
RITTENBERG, G.
4294*
RIVERA-CALIMLIM, L.
3999
ROBERTS, D.M.
4506
ROBERTS, H.J.V.
4623
ROBERTS, R.B.
4146
ROBERTSON, J.I.S.
4395
ROBLES, E.A.
4493*
ROCHANT, H.
4683
RODESCH, P.
4262
RODRIGUEZ-TORRES, R.
4869
ROEN, S.A.
4675
ROHDE, J.E.
4849*
ROJAS, R.
4825
ROKA, L.
4654
ROLAND, M.
4372*
ROMAN, D.
4193
ROSATO, E.F.
4635
ROSATO, F.E.
4635
ROSCH, J.
4264
ROSE, R.C.
4153
ROSEMAN, D.M.
4482
ROSEN, A.
4011
ROSEN, A.P.
4352
ROSEN, P.
4326
ROSEN, R.B.
4692
ROSENBERG, I.H.
4492*
ROSENBERG, M.T.
4239
ROSENDALL, A.F.
4157*
ROSENFELD, L.
4908
ROSENKRANTZ, J.G.
4860
ROSENLUND, B.
4854*
ROSENTHAL, S.
4226*
ROSENTHAL, W.S.
3924*, 4062*
ROSENWARNE, M.D.
4827
ROSS, A.P.
4592, 4807*
ROSS, F.P.
4410
ROSSITER, M.A.
4512
ROUACH, H.
4124*
ROWINSKI, J.
4189
ROWLAND, G.F.
4851*
ROZE, C.
4046
ROZMANITH, J.S.
4630*
RUBIN, E.
4123*
RUBIN, P.E.
4771*
RUBIO, C.
4488*
RUDICK, J.
4180
RUDZKI, A.
3927*
RUDZKI, Z.
3928*
RUMMEL, W.
4022, 4196
RUNCAN, V.
4245
RUNDELL, K.
4351
RUSSELL, R.G.G.
3977*
RYAN, G.B.
3940
SAAB, M.
4071*
SADR, A.
4317
SAFRANY, L.
4380
SAILER, S.
4789
SAITO, T.
4912
SAKITA, T.
4273, 4346

SALDINO, R.M.
4604*
SALMAN, A.J.
4099*
SALMENKIVI, K.
4616, 4652
SALMI, H.J.
4643
SALMON, P.R.
4231*, 4233*
SALTZSTEIN, S.L.
4831
SAMA, S.
4781*
SAMLOFF, I.M.
4349
SAMMONS, H.G.
4508
SAMSON, R.H.
4373*
SAMSONOV, V.S.
4308
SAMUELS, M.
4778*
SANCHEZ, D.
4332*
SANDERS, R.J.
4465
SANDHOFER, F.
4789
SANDLOW, L.J.
4879
SANFORD, J.P.
4688
SANO, R.
4346
SANOUDOS, G.M.
4318
SANZENBACHER, L.J.
4841*, 4852*
SARIN, G.S.
4945
SARLES, H.
4111, 4650
SASS-KORTSAK, A.
4770*
SATAKE, K.
4630*
SATOMURA, K.
4540
SAVAGE, D.
4417*
SAVILAHTI, E.
4496*
SAWH, P.C.
4175
SAWICKI, J.E.
4399
SAWICKI, W.
4189
SAWYERS, J.L.
4393
SAXBE, W.B., JR.
4410
SBUELZ, B.
4387
SCARAMUZZI, R.J.
4764*
SCHADLOW, A.R.
4471
SCHAEFER, J.M.
3926*
SCHAFFNER, F.
4122*, 4664*
SCHAMROTH, L.
4424*
SCHARF, R.
4006
SCHARNBECK, H.J.
4122*
SCHEINBERG, I.H.
4665*
SCHENK, E.
4272
SCHENK, W.G., JR.
4785
SCHENKER, S.
4131, 4714*
SCHERL, B.A.
4596
SCHERL, N.D.
4596
SCHIER, J.F.
4006
SCHILLER, E.L.
4931
SCHILLER, W.R.
4655
SCHIMMELPFENNING, W.
4747
SCHIRMER, R.G.
4470
SCHJONSBY, H.
4522
SCHLEGEL, J.F.
4316
SCHMAHL, F.W.
4654
SCHMAMAN, A.
4843*
SCHMID, H.
4938
SCHMOYER, I.R.
4602*
SCHNEIDER, R.
4508, 4523*
SCHOENFIELD, L.J.
4120*
SCHOLZ, F.J.
4290
SCHOOFS, E.
4334
SCHRAGER, J.
4344
SCHROCK, T.R.
4487
SCHRUMPF, E.
4854*
SCHUIT, K.E.
4140
SCHULMAN, M.P.
4116*
SCHULZ, I.
4091*
SCHUMACHER, H.R.
4294*
SCHUMAN, B.M.
4268, 4277
SCHUSTER, M.M.
4049, 4279, 4432
SCHWARTZ, A.E.
4870, 4871
SCHWARZ, F.J.
3983*
SCHWEISTHAL, M.R.
3937
SCHWEMMLE, K.
4259
SCOTT, F.
4919*
SCOTT, H.W., JR.
4393
SCOTT, M.L.
3932*
SCOTTI, P.
4694, 4739*
SCRATCHERD, T.
4107
SEAH, P.P.
4512
SEARS, H.F.
4826
SEARS, H.F., II
4796*
SEDGWICK, C.E.
4461
SEGAL, H.L.
4349
SEGERSTROM, A.
4023*
SEIFERT, E.
4305, 4343
SELLE, J.G.
4800*
SELYE, H.
4370*
SEMION, A.A.
4712*
SERENO, M.M.
3942
SERJEANT, G.R.
4403
SEYMOUR, E.Q.
4319
SHAH, I.C.
4573
SHAKER, A.
4920*
SHAKESPEARE, P.
4188
SHAMBERGER, R.J.
4342
SHANBOUR, L.L.
3976*
SHANKS, R.A.
4598
SHANLEY, B.C.
4905
SHAPIRO, J.H.
4363*
SHAPIRO, R.
4833
SHAROVA, K.P.
4865

SHARP, H.L.
4771*
SHAW, H.M.
4113
SHAW, J.
4131
SHAW, J.J.
4923, 4936
SHELDON, G.F.
4621
SHERLOCK, P.
4336, 4348, 4467
SHERLOCK, S.
4749, 4753, 4778*, 4779*, 4802*
SHIBASAKI, S.
3969
SHIELDS, R.
4148, 4368*, 4412
SHILKIN, K.B.
4666*
SHINYA, H.
4266, 4549
SHIZGAL, H.M.
4149
SHLIAKHTINA, L.S.
3954
SHOEMAKER, R.
4074
SHOREY, B.A.
4476*
SHOREY, J.W.
4688
SHORTER, R.G.
4587*
SHRAND, H.
4812
SHWACHMAN, H.
4834*, 4835*
SIBINGA, M.S.
4612
SIDDIQUI, D.A.
4615
SIEGEL, B.A.
4902
SIFFERT, G., JR.
4377
SIKORA, J.
4474
SILBER, W.
4864
SILEN, W.
3985*
SILK, D.B.A.
4419*
SILVA, J.
4904
SILVERMAN, N.H.
4939
SILVERSTEIN, M.N.
4661*
SILVIS, S.E.
4355, 4398, 4409, 4845*
SIMON, B.
4091*
SIMON, F.R.
4804*
SIMON, J.B.
4805*
SIMON, L.
4345
SIMONIAN, S.
4339
SIMPSON, A.
4622
SIMPSON, B.R.
4722
SINGH, M.
4098*
SINGH, S.D.
4263, 4791
SINHA, S.N.
4469
SIRCUS, W.
4626
SIRTORI, C.R.
4766
SIVALINGAM, S.
4721, 4934
SIZARET, P.
4242
SIZEMORE, G.W.
4852*
SJOBERG, N.O.
3972
SKERRETT, P.V.
4635
SKINNER, D.B.
4407
SLAPACK, M.
4149
SLIFER, E.D.
4403
SLOAN, A.W.
4367*
SMAJE, L.H.
4060
SMALL, D.M.
4118*
SMALLWOOD, C.J.
4439
SMIGLA, K.
4875
SMITH, A.N.
4589*
SMITH, B.H.
4232*
SMITH, E.F.
4170
SMITH, J.C., JR.
4186
SMITH, J.G.
4417*
SMITH, M.
4666*, 4762
SMITH, M.W.
4001
SMITH, P.J.B.
4481
SMITH, T.M.
4932
SNYDER, M.J.
4866
SNYGG, A.C.
4899
SOBHON, P.
4072*
SODERBERG, C.H., JR.
4883
SOENO, T.
4912
SOFFIE, M.
4526*
SOLL, E.L.
4560
SOLOAGA, J.C.
4110
SOLOMON, A.
4843*
SOLOVYEVA, N.A.
4865
SOLOWAY, R.D.
4120*
SOMMERS, S.C.
4527*
SOROFF, H.S.
4339
SOS, T.
4335
SOSCHKO, M.
4126
SOTNIKOV, V.N.
4308
SOTO, G.
4825
SOYER, T.
4677
SPELLBERG, M.A.
4879
SPENCE, L.
4741
SPENCER, H.
4192
SPENCER, R.J.
4587*
SPIERS, A.S.D.
4203*
SPIRO, H.M.
4640
SPRINGBERG, P.D.
4067*
SREENIVAS, V.I.
4434
SRIVASTAVA, V.K.
4622
ST. CLAIR, W.R.
4449
STADIL, F.
4246, 4848*
STAGE, L.
4205
STAGG, B.H.
4847*, 4890
STAHL, J.
3950
STANCIU, C.
4298*
STANKLER, L.
4485
STARK, A.E.
4113
STARZL, T.E.
4631*
STATE, I.

4245
STAUB, G.F.
4897
STEELE, L.A.
4115*
STEELE, M.
4621
STEIGER, E.
3962
STEIN, A.
4424*
STEIN, H.
4843*
STEINBERG, D.
4861
STEINBERG, D.M.
4483
STEINBERG, T.
4426
STEINFELD, C.M.
4892
STEMING, G.F.
4887
STEMMELIN, N.
4650
STEMMERMANN, G.N.
4570
STERN, D.H.
4025*, 4037, 4397
STERN, R.B.
4758*
STERNLIEB, I.
4665*
STERNS, E.E.
4221
STEVEN, L.W.
4623
STEVENSON, D.
4732*
STIEHL, A.F.
4117*
STOCKEN, L.
4145
STOKER, T.A.M.
4669*
STOLLER, J.L.
4391
STONE, D.D.
3971
STORMBY, N.
4225*
STRAUCH, G.O.
4882
STRAUS, E.
4694, 4739*
STRICKLAND, T.G.
4337
STROMBECK, D.R.
4003
STRONG, C.G.
4128
STRUNIN, L.
4722
STUART, J.R.
4457
STUCKELBERG, G.
4473
STURDEVANT, R.A.L.
4025*, 4037
SUBBIAH, M.T.R.
4130
SUBBIAH, R.
4058*
SUBOTIC, Z.
4514
SUGARBAKER, P.H.
4251
SUGAWARA, K.
4044
SUGIHARA, R.
3968
SUGIMURA, K.
4010
SUMIYOSHI, S.
4686
SUMMERSKILL, W.H.J.
4094*, 4603*
SURIYAPA, C.
4655
SURPURIYA, V.
4816
SURUR, J.M.
4141
SUSKIND, R.M.
4744
SUTOR, D.J.
4810, 4814
SUYAMA, T.
4002
SUZUKI, H.
4379
SUZUKI, S.
4379
SUZUKI, T.
4236*
SVANVIK, J.
4205, 4206
SVENDLER, C.A.
4838*
SWAIM, W.R.
4364*, 4366*
SWAMINATHAN, N.
3980*
SWAN, C.H.J.
4069*
SWAN, K.G.
4028*
SWAN, P.B.
3946
SWARTZ, M.
4525*
SWARTZ, R.M.
4425
SWELL, L.
4775*, 4776*, 4808*
SWINTON, N.W.
4524*
SYCHLOWY, A.
4875
SYCINSKI, Z.
4448
SZAFRAN, Z.
4401
SZENDREI, L.
4878
SZMUNESS, W.
4731*
TABBARA, W.
4384
TAFURI, W.L.
4048
TAKAGI, K.
4054
TAKAHASHI, Y.
3969
TAKAYANAGI, I.
4054
TAKEMOTO, T.
4379
TAKEUCHI, A.
4866
TAKEUCHI, M.
3936
TAKEUCHI, O.
4101
TAKKI, S.
4490*
TANAKA, Y.
4301
TANDON, R.N.
4674*
TAPIA, H.R.
4128
TARUSAWA, T.
4340
TASLER, J.
4057*, 4104
TASSO, F.
4650
TATARZYNSKA, A.
4448
TAUBIN, H.L.
4640
TAUSSIG, L.M.
4604*
TAVADIA, H.B.
4569
TAVERNIER, J.
4682
TAYLAUR, C.E.
4216
TEAGUE, P.O.
4771*
TEAGUE, R.H.
4233*
TEALE, J.D.
4019
TEGNER, H.
4657
TEMPLETON, J.Y.
4498*
TENHUNEN, R.
4644
TENNANT, B.
4452
TERAYAMA, H.
3965
TERNOUTH, J.H.
4112
TESSIER, F.
4859
TESTA, H.J.
4234*
TETREAULT, L.

4083
THALER, M.M.
4121*
THAYER, W.R., JR.
4077
THEMANN, H.
4506
THITHAPANDHA, A.
4072*
THOMAS, D.R.
4562
THOMAS, E.
4416*
THOMAS, H.F.
4040
THOMAS, L.B.
4257
THOMAS, P.J.
4120*
THOMASSON, B.
4478
THOMPSON, J.C.
4063*, 4075, 4081
THOMPSON, J.H.
4089
THOMPSON, R.P.H.
4705*
THOMPSON, W.J.
4055*
THOMSON, J.P.S.
4568
THOUVENOT, J.
4051
THROWER, S.
4145
THURIAUX, M.C.
4927
THURLBECK, W.M.
4033
TIJTGAT, G.
4837*
TIN, A.D.
4518
TISCORNIA, O.M.
4111
TOCCALINO, H.
4431, 4853*
TOIVANEN, A.
4556
TOIVANEN, P.
4556
TOLEDO-PEREYRA, L.H.
4830
TOLSTYKH, P.I.
4347
TOMASINI, J.T.
4488*
TOMIYAMA, A.
4054
TONDEUR, M.
4684
TONER, P.G.
3947
TOONDER, F.G.
4460
TOOULI, G.
4868
TORIZUKA, K.
4236*
TORRANCE, H.B.
4234*
TORRES, V.G.
4724
TORTUERO, F.
4213
TOSKES, P.P.
4612
TOUNTAS, C.
4634
TOWNLEY, R.R.W.
4415*
TRACK, N.S.
4209
TRAIGER, G.J.
4147
TRANCANELLI, V.
4155
TRIER, J.S.
3941, 4588*
TRIPATZIS, I.
4751
TROJNIAK, T.
4448
TRUELOVE, S.C.
4497*
TRUONG, T.K.
4267
TSAI, S.H.
4930
TSUBOUCHI, S.
3960
TSUCHIYA, K.
4045
TSUCHIYA, M.
4413*, 4418*
TSUKIMOTO, I.
4601*
TSUZUKI, T.
4678
TUCHWEBER, B.
3948
TUGWELL, P.
4710
TULLIS, R.H.
4550
TUMA, D.J.
4125
TURCOTTE, J.G.
4782*
TURNBULL, A.D.
4326
TURNER, F.P.
4299
TURNER, L.
4937
TURNER, M.D.
4272
TURNER, R.
4294*
TUTTON, P.J.M.
3974
TUYNS, A.J.
4241
TYTKO, S.
4342
UCHIDA, M.
4054
UCHIYAMA, T.
4678
UEHLING, D.
4554
UEKI, S.
4540
ULLRICH, V.
4196
UPSHUR, J.K.
4653
UYLANGCO, C.
4413*
VADAS, M.
4286
VALVERDE, I.
4193
VAN DE WATER, J.M.
4692
VAN DEN HAMER, C.J.A.
4665*
VAN DER DIJS, B.
4142
VAN DER LINDEN, W.
4795*
VAN GORP, L.H.M.
4695
VAN HOUTEN, F.X.
4451, 4821
VAN METER, S.W.
4632*
VAN OUTRYVE, M.
4334
VANASIN, B.
4049
VARAWIDHYA, W.
4745
VARBIRO, B.
4878
VARS, H.M.
3962
VARS, L.
4411
VASIL'EVA, E.N.
4105
VASILE, N.
4683
VASILEVSKAIA, L.S.
4105
VASILJEV, P.N.
4708
VATSIS, K.P.
4116*
VEGNENTE, A.
4198
VEIDENHEIMER, M.C.
4524*
VEJLSCAARD, R.
4922*
VERMA, T.R.
4436
VERTENYI, A.
4878
VERVAEKE, I.
4215
VESTERMARK, S.
4591*
VETRELLA, M.

4198
VIGUIE, R.
4388
VIJAYVARGIYA, R.
4791
VILLANUEVA, M.L.
4193
VILLAREJOS, V.M.
4740*
VINCE, A.
4191, 4529*
VINEYARD, G.C.
4251
VISWANATHAN, J.
4943
VIZI, E.S.
4173
VLAHCEVIC, Z.R.
4775*, 4776*, 4808*
VOEGELI, E.
4235*, 4247
VOGES, P.
4694, 4739*
VON BERGEN, M.
4389
VON ESSEN, T.
4496*
VONCKERS, E.
4334
VYAS, G.N.
4223
WADE, D.N.
4004
WAGENER, H.H.
4933
WAGNER, H.H.
4305
WAGNER, R.
4607
WAHN, K.
3950
WAKSMAN, B.H.
3933*
WALCZAK, Z.
4401
WALDRAM, R.P.L.
4239
WALKER, A.R.P.
4579
WALKER, B.F.
4579
WALKER, G.
4357
WALKER-SMITH, J.A.
4495*, 4611
WALKER, W.H.C.
4269
WALLACE, C.K.
4043
WALLER, S.L.
4895
WALSH, J.H.
4397
WALT, A.J.
4133
WALTON, B.
4722
WANG, L.T.
4916*
WANGENSTEEN, O.H.
4438
WANGENSTEEN, S.L.
4796*
WANTUCH, C.
4086
WARD, P.
4830
WARD, R.D.
4923, 4936
WARDLE, E.N.
4227*
WARNER, J.O.
4304
WARON, M.
4680
WARREN, K.W.
4807*
WARSHAW, A.L.
4911
WATANABE, K.
4601*
WATANABE, Y.
4418*
WATSON, D.
4736*
WATSON, N.E., JR.
4876
WAYE, J.D.
4468
WEBB, J.
4569
WEBER, R.
3959
WEBSTER, A.J.F.
4217
WEBSTER, P.D.
4098*
WEIBEL, M.H.
4207
WEIDMAN, W.
4896
WEIFENBACH, Y.
4933
WEINFELD, I.
4869
WEINSTEIN, L.
4178
WEISER, M.M.
4166*, 4167*
WEISMANN, R.E.
4840*
WEISS, M.
4480
WEISSINGER, J.L.
4009
WEITZMAN, J.J.
4860
WELLAUER, P.
3959
WELLISCH, M.
4282
WENSVOORT, P.
3970
WENZL, M.
4790
WERBELOFF, L.
4842*
WEST, C.F., JR.
4584
WESTERBUHR, L.M.
4354
WESTERGAARD, H.
4759*
WETLI, C.V.
4725*
WHEELER, J.H.
4885
WHELAN, T.J., JR.
4717
WHITE, F.
4217
WHITEHEAD, R.
4497*
WHITEHEAD, R.G.
4501, 4502, 4520
WHYTE, A.S.
4569
WIJERS, J.B.
4941
WILEN, S.
4869
WILKINSON, L.S.
4761
WILKINSON, R.H.
4376
WILLIAMS, J.
4320
WILLIAMS, J.L.
4545
WILLIAMS, M.
4431, 4853*
WILLIAMS, M.J.
4477*
WILLIAMS, R.
4666*, 4705*, 4758*, 4752,
4773*, 4777*, 4786
WILLIAMS, R.E.
4481
WILLIAMS, R.H.
4055*
WILLIAMS, V.J.
4050
WILLIS, C.E.
4342
WILLMAN, V.L.
4533
WILLS, M.R.
4013
WILMORE, D.W.
3944
WILSON, E.
4572, 4595
WILSON, R.E.
4582
WILSON, R.G.
4238
WILSON, R.Y.
4847*
WINANS, C.S.
4271
WINAWER, S.J.
4336, 4348
WINNE, D.
3990*, 4005

WINTZERITH, M.
3956
WIRTS, C.W.
4498*
WISCH, N.
4593
WISE, R.E.
4290
WISHAHI, A.
4920*
WITTENBERG, J.
4914*
WIZEMANN, V.
4091*
WOLF, G.
4790
WOLFF, W.I.
4266, 4549
WOLFMAN, E.F., JR.
4613
WOLLAEGER, E.E.
4661*
WOLLIN, A.
3996*
WOOD, E.C.
4154
WOOD, L.A.
4692
WOODS, J.E.
4128, 4719
WOODWARD, E.R.
4040, 4324
WOOLEY, S.E.
4810, 4814
WOOLFORD, A.
4579
WOOLNER, L.B.
4892
WORDEN, A.N.
4154
WORTHINGTON, B.B.
3938
WORWOOD, M.
3939
WRIGHT, J.T.
4422*, 4456
WRIGHT, P.H.
4538
WRIGHT, V.
4594
WU, K.T.
4741
WUNDER, J.F.
4458
WURTMAN, R.J.
4515
WYATT, A.P.
4538
WYATT, R.G.
3942
WYLER, T.
3959
YABEK, S.
4869
YAKATA, M.
4614
YAMADA, A.
4300
YAMADA, K.
4379
YAMADA, M.
4002
YAMAHIRO, H.S.
4734*
YAMAMOTO, K.
3965
YAMASHITA, H.
4301
YATANI, R.
4570
YELLIN, A.E.
4029, 4699
YEO, C.K.
4464
YIOTSAS, Z.D.
4929
YLIKAHRI, R.H.
4668*
YODAIKEN, R.E.
4713*
YOSHIDA, T.
4776*
YOSHII, Y.
4271, 4276
YOSHIOKA, T.
4301
YOUNG, F.
4816
YOUNOSZAI, M.K.
4200
YUEN, L.
4089
YUNIS, E.J.
4539
ZAFAR, K.
4578
ZAJACZKOWSKA, M.
4073, 4088
ZAPPIA, L.
4076
ZAVERI, M.P.
4405
ZBARSKY, S.H.
4174
ZEIGLER, M.G.
4028*
ZEITLIN, I.J.
4589*
ZENIBA, T.
4053
ZHERIKOVA, A.D.
4865
ZHURAVLEV, V.A.
4708
ZIEGE, M.
4014
ZIMMERMAN, M.J.
4480
ZOHRAB, W.J.
4846*
ZOLLINGER, R.M.
4841*
ZUIDEMA, G.D.
4407, 4629*
ZUJOVIC, J.
4910
ZWEIG, A.
4798*

NUMBERS FOLLOWED BY AN ASTERISK INDICATE ABSTRACTS. OTHER NUMBERS REFER TO CITATIONS.

- ABDOMEN
  - ABSCESS
    - SCANNING, SCINTILLATION, 4904
  - PAIN
    - IRRITABLE COLON, 4577
  - TRAUMA
    - SURGERY, 4882

- ABDOMEN, ACUTE
  - DISEASES ASSOCIATED WITH
    - CIRCULATION, 4569
  - RADIOLOGY, 4265

- ABSCESS
  - ABDOMEN
    - SCANNING, SCINTILLATION, 4904
  - ANUS, 4568
  - FISTULA
    - ANUS, 4574
  - LIVER
    - AMEBIASIS, 4944
    - ANTIBIOTICS, 4724
    - ANTIINFLAMMATORY AGENTS, 4724
    - FUNGUS, 4724
    - SCANNING, SCINTILLATION, 4915*
    - SURGERY, 4698
  - PANCREAS
    - DRAINAGE, 4634

- ABSORPTION
  - ALCOHOL
    - CELIAC DISEASE, 4357
    - GASTRECTOMY, 4357
    - PYLOROPLASTY, 4357
    - VAGOTOMY, 4357
  - AMINO ACIDS
    - CHOLERA, 4849*
    - CYSTIC FIBROSIS, 4618
    - INFECTION, BACTERIAL, 4021
  - BILE ACIDS
    - CHOLESTYRAMINE, 4012
  - BILIARY TRACT
    - SULFOBROMOPHTHALEIN, 4008
    - WATER, 4008
  - CALCIUM
    - DRUG EFFECTS ON, 3994*
    - DUODENUM, 3994*, 4001
    - INTESTINE, 3977*, 4013
  - CATECHOLAMINES
    - DRUG EFFECTS ON, 3999
    - INTESTINE, 3999
  - CHOLINE
    - INTESTINE, 3981*
    - KINETICS, 3981*
  - COLON
    - CONSTIPATION, 4526*
  - COLOSTRUM
    - IMMUNOGLOBULINS, 3931*
  - COPPER
    - DIETARY FACTORS, 3983*
    - INTESTINE, 3983*
  - ELECTROLYTE
    - COLON, 3987*
  - FOLIC ACID
    - DRUG, 4492*
    - SMALL INTESTINE, 3975*
  - GASTROINTESTINAL
    - ANTIINFLAMMATORY AGENTS, 4002
  - GLUCOSE
    - CHOLERA, 4849*
    - INTESTINE, 3980*, 4014
  - INTESTINE
    - CATECHOLAMINES, 4004
    - ENDOCRINE SYSTEM, 3989*
    - GLUCOSE, 3998
    - LECITHIN, 3992*
    - PANTOTHENIC ACID, 3998
    - SHOCK, 3982*
    - TECHNIQUES, 4018
  - IRON
    - NEONATE, 3984*
    - PANCREAS DISEASE, 4108
    - SMALL INTESTINE, 3984*
    - STOMACH, 3928*
  - JEJUNUM
    - AMINO ACIDS, 4005
    - DERMATITIS HERPETIFORMIS, 4419*
  - LIPIDS
    - LECITHIN, 3992*
    - MALABSORPTION, 4514
    - SMALL INTESTINE, 3996*
  - MACROMOLECULE
    - ENDOCRINE SYSTEM, 3989*
    - HORMONE EFFECTS ON, 4000
    - SMALL INTESTINE, 4000
    - STEROID, 3988*
  - MAGNESIUM
    - DUODENUM, 4001
  - PANCREAS, 4095*
    - DRUG EFFECTS ON, 4098*
  - SMALL INTESTINE
    - AMINO ACIDS, 4175
    - CIRCULATION, 4206
    - ISCHEMIA, 4447
    - STEROID, 3988*
    - SUGAR, 4175
    - TRIGLYCERIDE, 3929*
  - SODIUM
    - SMALL INTESTINE, 4020
  - SUGAR
    - DIABETES, 4019
    - DRUG EFFECTS ON, 4019
    - SMALL INTESTINE, 3979*, 4020
    - SODIUM, 4016
    - STARVATION, 4019
  - TRIGLYCERIDE, 4007
  - VIRUS
    - ILEUM, 3938
  - VITAMIN A
    - CHOLESTYRAMINE, 4012
    - LIGNIN, 4012
  - VITAMIN B12
    - ACHLORHYDRIA, 4366*
    - GASTRECTOMY, 4366*
    - HYPOCHLORHYDRIA, 4366*
    - PANCREAS DISEASE, 4108
  - WATER
    - COLON, 3987*
    - HORMONE CONTROL, 3978*
    - HORMONE EFFECTS ON, 3986*
    - LARGE INTESTINE, 3986*, 4050
    - SMALL INTESTINE, 4050
    - VAGOTOMY, 4368*
  - ZINC
    - DIETARY FACTORS, 3983*
    - INTESTINE, 3983*

- ACETYLCHOLINE

- ILEUM
  - NERVOUS CONTROL, 4173

ACHALASIA
- SURGERY
  - TECHNIQUES, 4322

ACHLORHYDRIA
- SEE ALSO ACID SECRETION
- STOMACH
  - ENZYMES, 4361
  - NEOPLASMS, MALIGNANT, 4349
- VITAMIN B12
  - ABSORPTION, 4366*

ACID PHOSPHATASE
- SEE PHOSPHATASE, ACID

ACID SECRETION
- SEE ALSO ACHLORHYDRIA
- SEE ALSO HYPERCHLORHYDRIA
- SEE ALSO HYPOCHLORHYDRIA
- DUODENUM
  - ULCER, 4385, 4386, 4391, 4401
- GASTRITIS
  - IMMUNOSUPPRESSION, 4332*
- PEPTIC ULCER
  - DIETARY FACTORS, 4383
  - ETHNIC FACTORS, 4386
  - SECRETIN, 4409
  - VAGOTOMY, 4402
- STOMACH
  - ADENOSINE TRIPHOSPHATE, 4064*
  - ALCOHOL, 4352
  - BLOOD GROUP, 4367*
  - CHOLECYSTOKININ, 4887
  - CITRIC ACID, 4070*
  - CONSTITUTIONAL FACTORS, 4367*
  - CYCLIC ADENOSINE MONOPHOSPHATE, 4082
  - DIETARY FACTORS, 4383
  - ELECTROPHYSIOLOGY, 4078
  - FLUORIDE, 4074
  - HISTAMINE, 4072*, 4082
  - PEPTIC ULCER, 4367*
  - SECRETIN, 4372*, 4887
  - SMOKING, 4367*
  - SURGERY, 4066*
  - VAGOTOMY, 4372*
  - ZOLLINGER-ELLISON SYNDROME, 4887, 4890

ACIDITY
- ION TRANSPORT
  - STOMACH, 4015
- MOTILITY
  - ILEUM, 4052
- ULTRASTRUCTURE
  - STOMACH, 4015

ACIDOSIS
- ALCOHOL, 4763*, 4768
- STOMACH
  - SURGERY, 4518

ADAPTATION
- LACTOSE INTOLERANCE
  - CHILDREN, 4499
- LIVER
  - HYPERTROPHY, 4678

ADENOSINE TRIPHOSPHATASE
- SALIVARY GLANDS
  - ULTRASTRUCTURE, 4171

ADENOSINE TRIPHOSPHATE
- ACID SECRETION
  - STOMACH, 4064*
- SMALL INTESTINE
  - ALCOHOL, 4169*

ADENYL CYCLASE
- STIMULATION
  - SECRETIN, 4055*

ADHESIONS
- PERITONEUM
  - FOREIGN BODIES, 4889

ADHESIVES
- SEE TISSUE ADHESIVES

ADOLESCENTS
- CHOLECYSTITIS, 4826

ADRENERGIC AGENTS
- MOTILITY
  - SMALL INTESTINE, 4054

AFLATOXIN
- LIVER
  - ULTRASTRUCTURE, 3964

AGE FACTORS
- SEE ALSO CHILDREN, NEONATE
- CHOLELITHIASIS, 4795*
- CIRRHOSIS
  - IMMUNOLOGY, 4771*, 4772*
- DUODENUM
  - ULCER, 4391
- FATTY ACIDS
  - METABOLISM, 4176
- HEPATITIS, VIRAL
  - ANTIGEN, AUSTRALIA, 4750
- ILEUM
  - NEOPLASMS, MALIGNANT, 4470
- INTESTINE
  - DRUG ABSORPTION, 4009
- LIVER
  - ION TRANSPORT, 3955
- PARASITES AND PARASITIC DISEASE
  - EPIDEMIOLOGY, 4927
- SMALL INTESTINE
  - CHEMICAL COMPOSITION, 4200
  - ENZYMES, 4174, 4198

ALBUMIN
- METABOLISM
  - MENETRIERS DISEASE, 4358
  - PROTEIN-LOSING ENTEROPATHY, 4471

ALCOHOL
- ABSORPTION
  - CELIAC DISEASE, 4357
  - GASTRECTOMY, 4357
  - PYLOROPLASTY, 4357
  - VAGOTOMY, 4357
- ACIDOSIS, 4763*, 4768

    ADENOSINE TRIPHOSPHATE
        SMALL INTESTINE, 4169*
    FATTY LIVER
        DRUG EFFECTS ON, 4124*
        INHIBITION, 4668*
        LIPOPROTEINS, 4117*
    FOLIC ACID
        DEFICIENCY, 4493*
    ION TRANSPORT
        SMALL INTESTINE, 3976*
    KETOSIS, 4763*, 4768
    LIPOPROTEINS
        METABOLISM, 4766
    LIVER
        ENZYMES, 4123*
        METABOLISM, 4147
        ULTRASTRUCTURE, 3953
    LIVER INJURY
        CARBON TETRACHLORIDE, 4147
    METABOLISM
        BILIRUBIN, 4152
        CATALASE, 4116*
    PANCREAS
        SECRETION, 4111
    PANCREATIC DUCT
        REFLUX, 4635
    PANCREATITIS
        ETIOLOGY, 4635, 4636, 4638
    STOMACH
        ACID SECRETION, 4352
        MORPHOLOGY, 4352

ALCOHOLIC LIVER DISEASE
    SEE LIVER DISEASE, ALCOHOLIC

ALKALINE PHOSPHATASE
    SEE PHOSPHATASE, ALKALINE

ALKALOSIS
    DIARRHEA
        CHILDREN, 4875
    DUODENUM
        ULCER, 4401

AMEBIASIS
    CARRIER STATE, 4926
    CECUM
        DRUG TREATMENT, 4929
    DIAGNOSIS
        SCANNING, SCINTILLATION, 4915*
    EPIDEMIOLOGY
        CHILDREN, 4919*, 4942
        IMMUNOLOGY, 4919*
        TRANSMISSION, 4926
    IMMUNOLOGY
        CHILDREN, 4942
        DIAGNOSIS, 4267
    INTESTINE
        DRUG TREATMENT, 4935, 4940
    LARGE INTESTINE
        ULTRASTRUCTURE, 4531
    LIVER
        ABSCESS, 4944
        DRUG TREATMENT, 4929, 4930
        SURVIVAL, 4930
        THERAPY, 4934
    LIVER DISEASE, 4721
    RECTUM
        PROLAPSE, 4943

AMINES
    LIVER INJURY
        CARBON TETRACHLORIDE, 4136

AMINO ACIDS
    ABSORPTION
        CHOLERA, 4849*
        CYSTIC FIBROSIS, 4618
        INFECTION, BACTERIAL, 4021
    FECES
        DIARRHEA, 4507
    GASTRITIS
        DRUG TREATMENT, 4388
    ION TRANSPORT
        DRUG EFFECTS ON, 3995*
        INTESTINE, 3991*, 4158*, 4159*
    JEJUNUM
        ABSORPTION, 4005
        CIRCULATION, 4005
    LIVER
        RIBOSOMES, 3946
    METABOLISM
        LIVER, 4932
        SMALL INTESTINE, 4181
    PEPTIC ULCER
        DRUG TREATMENT, 4388
    SMALL INTESTINE
        ABSORPTION, 4175
    STOMACH
        SECRETION, 4089

AMMONIA
    LARGE INTESTINE
        BACTERIA, 4191

AMPULLA OF VATER
    NEOPLASMS, MALIGNANT
        SURGERY, 4427, 4617

AMYLASE
    BLOOD
        KIDNEY TRANSPLANTATION, 4631*
    PANCREAS
        ILEUS, 4912
        PERITONITIS, 4912
    SALIVARY GLANDS
        ILEUS, 4912
        PERITONITIS, 4912

ANASTOMOSIS
    SMALL INTESTINE
        HEALING, 4450

ANEMIA
    KWASHIORKOR
        DISEASES ASSOCIATED WITH, 4502, 4888

ANEMIA, HEMOLYTIC
    PANCREAS
        NEOPLASMS, MALIGNANT, 4619

ANEMIA, SICKLE CELL
    DUODENUM
        ULCER, 4403

ANESTHETICS
    HEPATITIS, NONVIRAL, 4722, 4723

ANESTHETICS, LOCAL
- DUODENUM
  - ULCER, 4377

ANGIOGRAPHY
- BILE DUCT
  - DIVERTICULUM, 4829
- BILIARY TRACT, 4247
  - TECHNIQUES, 4238, 4290
  - TISSUE ADHESIVES, 4255
- CIRRHOSIS
  - CHILDREN, 4263
- GASTRITIS
  - BLEEDING, 4363*
- LARGE INTESTINE
  - INTUSSUSCEPTION, 4414*
  - PNEUMATOSIS, 4838*
- LIVER, 4293
  - DIAGNOSIS, 4229*
  - HEMANGIOMA, 4682
  - METASTASES, 4264
  - PORTAL HYPERTENSION, 4235*
  - THROMBOSIS, 4683
- LIVER DISEASE, 4292
- MESENTERY
  - CYSTS, 4874
- PANCREAS, 4293
- PEPTIC ULCER
  - BLEEDING, 4363*
- SMALL INTESTINE
  - INTUSSUSCEPTION, 4414*

ANOMALY
- DUODENUM
  - DISEASES ASSOCIATED WITH, 4500
- LIVER
  - MUCOPOLYSACCHARIDE, 4684
- STOMACH, 3971

ANOMALY, CONGENITAL
- BILE DUCT, 4819
- DUODENUM
  - SURGERY, 4425
- GALLBLADDER, 4823
  - RADIOLOGY, 4820
- ILEUM
  - OBSTRUCTION, 4453
- PANCREAS
  - PSEUDOCYST, 4624
- PYLORUS
  - STENOSIS, 4341
- SMALL INTESTINE
  - ISCHEMIA, 4436
- STOMACH
  - OMPHALOCELES, 4860
  - PSEUDOCYST, 4624

ANORECTUM
- SURGERY
  - NERVOUS CONTROL, 4583

ANTACIDS
- DUODENUM
  - ULCER, 4377
- GASTROINTESTINAL
  - BLEEDING, 4339
- HERNIA, HIATUS, 4304

ANTIBACTERIALS
- DYSENTERY
  - BACTERIA, 4933
- FECES
  - BACTERIA, 4211
- PERITONITIS, 4893

ANTIBIOTICS
- SEE ALSO ANTIBACTERIALS, DRUG TREATMENT
- APPENDICITIS, 4562
- BACTERIA
  - NEONATE, 4859
- BILE
  - METABOLISM, 4146
- ENTEROCOLITIS
  - DRUG TREATMENT, 4884
- GASTROENTERITIS
  - DRUG TREATMENT, 4891
- GASTROINTESTINAL
  - MICROORGANISMS, 4215
- LIVER
  - ABSCESS, 4724
- PANCREATITIS
  - COMPLICATIONS, 4633*
- PERFUSION
  - PERITONITIS, 4839*

ANTIBODIES
- GASTRONE
  - IMMUNOGLOBULINS, 4062*
- INTESTINE, 3943

ANTICHOLINERGIC AGENTS
- GASTROINTESTINAL
  - DRUG ABSORPTION, 4011

ANTICOAGULANTS
- LARGE INTESTINE
  - HEMATOMA, 4473
  - OBSTRUCTION, 4473
- SMALL INTESTINE
  - HEMATOMA, 4473
  - OBSTRUCTION, 4473

ANTIDIARRHEALS
- ILEUS
  - ETIOLOGY, 4433

ANTIGEN, AUSTRALIA
- BLOOD, 4736*
- CARRIER STATE
  - DRUG ADDICTION, 4756*
  - HEPATITIS, CHRONIC, 4756*
  - LIVER FUNCTION TESTS, 4756*
- CIRRHOSIS
  - FAMILIAL FACTORS, 4755*
- DISEASES ASSOCIATED WITH
  - NEOPLASMS, MALIGNANT, 4745
- EPIDEMIOLOGY, 4731*
  - FAMILIAL FACTORS, 4745
  - MALNUTRITION, 4744
- HEPATITIS, CHRONIC
  - FAMILIAL FACTORS, 4755*
  - ULTRASTRUCTURE, 4737*
- HEPATITIS, SERUM
  - TRANSMISSION, 4752
- HEPATITIS, VIRAL
  - AGE FACTORS, 4750
  - DIAGNOSIS, 4258

    - TRANSMISSION, 4750, 4751
    - ULTRASTRUCTURE, 4737*
  - IMMUNOLOGY
    - HEPATITIS, CHRONIC, 4726*
    - HEPATITIS, SERUM, 4726*
  - INHIBITION
    - FECES, 4727*
    - INTESTINE, 4727*
  - ISOLATION, 4742
  - LIVER
    - MORPHOLOGY, 4730*
    - NEOPLASMS, MALIGNANT, 4755*
  - RADIOIMMUNOASSAY
    - CIRRHOSIS, BILIARY, 4781*
  - SERUM
    - ISOLATION, 4223
  - TECHNIQUES
    - HEPATITIS, VIRAL, 4245
  - ULTRASTRUCTURE
    - CIRRHOSIS, BILIARY, 4781*

- ANTIHYPERTENSIVE AGENTS
  - HEPATITIS, CHRONIC
    - ETIOLOGY, 4754*

- ANTIINFLAMMATORY AGENTS
  - CHOLERA
    - CYCLIC ADENOSINE MONOPHOSPHATE, 4195
  - CIRRHOSIS, 4676
  - GASTROINTESTINAL
    - ABSORPTION, 4002
  - INTESTINE
    - CYCLIC ADENOSINE MONOPHOSPHATE, 4195
  - JAUNDICE
    - ETIOLOGY, 4714*
  - LIVER
    - ABSCESS, 4724
  - PERITONITIS
    - FOREIGN BODIES, 4911

- ANTINEOPLASTIC AGENTS
  - PANCREAS
    - MORPHOLOGY, 4102
    - SECRETION, 4102
  - SALIVARY GLANDS
    - MORPHOLOGY, 4102
  - SMALL INTESTINE
    - KINETICS, CELL, 4199

- ANTISPASMODICS
  - BILE
    - SECRETION, 4150

- ANTITHYROID AGENTS
  - HEPATITIS, NONVIRAL
    - ETIOLOGY, 4715*

- ANTRECTOMY
  - SEE ALSO GASTRECTOMY
  - SEE ALSO STOMACH, SURGERY
  - GASTRIN
    - SYNTHESIS, 4063*

- ANTRUM
  - SEE ALSO STOMACH

- ANUS
  - SEE ALSO LARGE INTESTINE
  - ABSCESS, 4568
  - FISTULA
    - ABSCESS, 4574
    - SEPSIS, 4574
  - MOTILITY
    - ELECTROPHYSIOLOGY, 4032
  - NEOPLASMS, MALIGNANT, 4535
    - DISEASES ASSOCIATED WITH, 4536
  - PRESSURE STUDIES
    - HIRSCHSPRUNGS DISEASE, 4279

- APPENDICITIS
  - ANTIBIOTICS, 4562
  - ETIOLOGY
    - DIETARY FACTORS, 4579
  - PERFORATION
    - REGIONAL ENTERITIS, 4527*
  - SCHISTOSOMIASIS
    - MORPHOLOGY, 4938

- APPENDIX
  - SEE ALSO LARGE INTESTINE
  - CARCINOIDS
    - SURGERY, 4581
  - ISCHEMIA, 4460
  - NEOPLASMS, MALIGNANT, 4550
  - ULTRASTRUCTURE
    - IMMUNOGLOBULINS, 3933*
    - VIRUS, 4539

- ARTERY
  - RUPTURE
    - PSEUDOCYST, 4648

- ASCARIASIS
  - EPIDEMIOLOGY, 4918*
    - CHILDREN, 4917*
  - SMALL INTESTINE
    - RADIOLOGY, 4925

- ASCITES
  - PANCREATITIS, CHRONIC
    - COMPLICATIONS, 4658

- ASPARAGINASE
  - LIVER
    - INJURY, 3957

- ASPIRIN
  - GASTROINTESTINAL
    - BLEEDING, 4863

- ATHEROSCLEROSIS
  - COLITIS
    - ISCHEMIA, 4573

- ATRESIA
  - ESOPHAGUS
    - DISEASES ASSOCIATED WITH, 4314

- ATROPINE
  - STOMACH
    - SECRETION, 4073

- AUTOIMMUNITY
  - HEPATITIS, CHRONIC
    - ETIOLOGY, 4761

- AUTOLYSIS
    - LIVER, 4140

- BACTERIA
    - ANTIBIOTICS
        - NEONATE, 4859
    - BILE
        - BLIND LOOP SYNDROME, 4230*
    - BILIARY TRACT
        - SURGERY, 4416*
    - CHOLESTEROL
        - METABOLISM, 4058*
    - COLON
        - PERFUSION, 4529*
    - DIARRHEA, 4881
    - DYSENTERY
        - ANTIBACTERIALS, 4933
    - ENTEROCOLITIS, 4884
        - TRANSMISSION, 4556
    - FECES
        - ANTIBACTERIALS, 4211
        - CHILDREN, 4856
        - DIARRHEA, 4856, 4857
    - GASTRITIS
        - PANCREATITIS, CHRONIC, 4653
    - GASTROENTERITIS
        - TRANSMISSION, 4836*, 4850*
    - INTESTINE
        - NEONATE, 4859
    - LARGE INTESTINE
        - AMMONIA, 4191
    - MALABSORPTION
        - DISEASES ASSOCIATED WITH, 4500
        - LIPIDS, 4213
    - PANCREATITIS
        - COMPLICATIONS, 4633*
    - SMALL INTESTINE
        - STASIS, 4417*
        - SURGERY, 4417*
    - VITAMIN B12
        - MALABSORPTION, 4522

- BARIUM
    - PERITONITIS
        - LYMPHATICS, 4558

- BEZOARS
    - SEE FOREIGN BODIES

- BILE
    - BACTERIA
        - BLIND LOOP SYNDROME, 4230*
    - BILE ACIDS
        - CHOLELITHIASIS, 4806*
    - BLOOD VOLUME
        - SULFOBROMOPHTHALEIN, 4135
    - CHEMICAL COMPOSITION
        - CHOLELITHIASIS, 4813
    - COPPER
        - WILSONS DISEASE, 4665*
    - DIETARY FACTORS
        - CHOLELITHIASIS, 4794*
    - EXCRETION
        - CONTRAST MEDIA, 4126
    - GASTRITIS
        - ETIOLOGY, 4338
    - LIPIDS
        - CHOLELITHIASIS, 4806*, 4808*
        - CIRRHOSIS, 4776*
    - METABOLISM
        - ANTIBIOTICS, 4146
    - PEPTIC ULCER
        - STRESS, 4373*
    - SECRETION
        - ANTISPASMODICS, 4150
        - INHIBITION, 4119*
        - PENTAGASTRIN, 4153
    - STOMACH
        - MUCOSA, 3925*
    - VOMITING
        - HERNIA, HIATUS, 4299
        - SURGERY, 4299

- BILE ACIDS
    - ABSORPTION
        - CHOLESTYRAMINE, 4012
    - BILE
        - CHOLELITHIASIS, 4806*
    - CHOLELITHIASIS
        - THERAPY, 4794*
    - CIRCULATION
        - CELIAC DISEASE, 4803*
        - CHOLECYSTECTOMY, 4803*
    - COPPER
        - WILSONS DISEASE, 4667*
    - DIARRHEA
        - ETIOLOGY, 4423*
    - ILEUM
        - SURGERY, 4421*, 4423*
    - MALABSORPTION
        - DIET, 4491*
        - DRUG TREATMENT, 4491*
    - METABOLISM, 4120*
        - CHOLELITHIASIS, 4776*, 4808*
        - CIRRHOSIS, 4775*, 4776*
        - DIARRHEA, 4114*
        - MALABSORPTION, 4114*
    - PHYSICAL PROPERTIES
        - DIARRHEA, 4421*
    - SECRETION
        - DIET, 4118*
        - LIPIDS, 4120*
        - TRIGLYCERIDE, MEDIUM CHAIN, 4118*
    - SMALL INTESTINE
        - BLIND LOOP SYNDROME, 4422*
    - SYNTHESIS
        - CIRCADIAN RHYTHM, 4115*
    - WILSONS DISEASE
        - DRUG TREATMENT, 4667*

- BILE CANALICULI
    - ENZYMES
        - CHOLESTASIS, 4804*

- BILE DUCT
    - ANOMALY, CONGENITAL, 4819
    - CYSTS
        - MARKER STUDIES, 4288
        - RADIOLOGY, 4815
    - DILATATION
        - CYSTS, 4827
    - DIVERTICULUM
        - ANGIOGRAPHY, 4829
    - ENDOSCOPY, 4252
    - FISTULA
        - BILEMIA, 4798*
    - HAMARTOMA, 4830
    - MORPHOLOGY

- CIRRHOSIS, 4769*
- NEOPLASMS, MALIGNANT
  - SURGERY, 4617, 4807*
  - ULCERATIVE COLITIS, 4592, 4807*
- PANCREAS
  - HETEROTOPIA, 4606
- RADIOLOGY, 4231*
- STENOSIS
  - ETIOLOGY, 4606
  - NEOPLASMS, MALIGNANT, 4828
- STRICTURE
  - SURGERY, 4822, 4832

BILE SALTS
- SEE BILE ACIDS

BILEMIA
- BILE DUCT
  - FISTULA, 4798*

BILIARY
- FISTULA
  - JAUNDICE, OBSTRUCTIVE, 4451

BILIARY DISEASE
- CIRRHOSIS
  - GALACTOSAMINE, 4793
- SEPSIS, 4809

BILIARY TRACT
- ABSORPTION
  - SULFOBROMOPHTHALEIN, 4008
  - WATER, 4008
- ANGIOGRAPHY, 4247
  - TECHNIQUES, 4238, 4290
  - TISSUE ADHESIVES, 4255
- ENDOSCOPY, 4380
- FISTULA
  - RADIOLOGY, 4821
- INVASION
  - NEOPLASMS, MALIGNANT, 4685
- MOTILITY
  - ELECTROPHYSIOLOGY, 4031
  - HORMONE CONTROL, 4024*
  - NERVOUS CONTROL, 4024*
- SURGERY
  - BACTERIA, 4416*
  - COMPLICATIONS, 4652
  - PANCREATITIS, 4652

BILIRUBIN
- ALCOHOL
  - METABOLISM, 4152
- BLOOD
  - NERVOUS SYSTEM, 4707
- CHEMICAL PROPERTIES, 4207
- HYPERBILIRUBINEMIA
  - PHOTOTHERAPY, 4701*
- METABOLISM
  - HORMONE CONTROL, 4142
  - INTESTINE, 4121*
- TECHNIQUES
  - NEONATE, 4280

BINDING
- SEE METABOLISM
- IRON
  - MUCINS, 4065*, 4069*

BIOPSY
- GASTRITIS, 4272
- GASTROINTESTINAL
  - NEOPLASMS, MALIGNANT, 4275
- HEPATITIS
  - ETIOLOGY, 4716*
- LIVER
  - IMMUNOLOGY, 4695
- LIVER DISEASE, 4248
- PANCREAS, 4254

BLEEDING
- COLON
  - DIVERTICULUM, 4557
- DUODENUM
  - TELANGIECTASIA, 4468
- ESOPHAGUS
  - VARICES, 4330, 4777*
- GASTRITIS
  - ANGIOGRAPHY, 4363*
  - VASOPRESSIN, 4363*
- GASTROINTESTINAL
  - ANTACIDS, 4339
  - ASPIRIN, 4863
  - CROHNS DISEASE, 4480
  - CRYOTHERAPY, 4879
  - DISEASES ASSOCIATED WITH, 4880
  - DRAINAGE, 4799*
  - DRUGS, 4359
  - ENDOSCOPY, 4232*, 4239, 4268
  - NEOPLASMS, MALIGNANT, 4348
  - STRESS, 4339, 4348
  - SURGERY, 4880
  - SURVIVAL, 4376
  - TELANGIECTASIA, 4465
  - THERAPY, 4376
- JEJUNUM
  - NEOPLASMS, BENIGN, 4466
- LARGE INTESTINE
  - DIVERTICULUM, 4565
- LIVER
  - TRAUMA, 4799*
- PEPTIC ULCER
  - ANGIOGRAPHY, 4363*
  - RECURRENCE, 4371*
  - SURGERY, 4371*
  - SURVIVAL, 4371*
  - VASOPRESSIN, 4363*
- RECTUM
  - CHILDREN, 4578
  - ETIOLOGY, 4578
- STOMACH
  - CRYOTHERAPY, 4879
- VARICES
  - THERAPY, 4330

BLIND LOOP SYNDROME
- BILE
  - BACTERIA, 4230*
- REVIEWS, 4445
- SMALL INTESTINE
  - BILE ACIDS, 4422*
- VITAMIN B12
  - MALABSORPTION, 4522

BLOOD
- AMYLASE
  - KIDNEY TRANSPLANTATION, 4631*
- ANTIGEN, AUSTRALIA, 4736*

- BILIRUBIN
  - NERVOUS SYSTEM, 4707
- GASTRIN
  - SHOCK, 4081
  - ZOLLINGER-ELLISON SYNDROME, 4848*, 4854*, 4855*, 4890
- GLYCOPROTEINS
  - SCHISTOSOMIASIS, 4921*
- HORMONE
  - KWASHIORKOR, 4520
- LIPASE
  - PANCREATITIS, 4654
- LIPOPROTEINS
  - CHOLESTASIS, 4673*
- PROTEIN
  - CIRRHOSIS, BILIARY, 4780*
  - KWASHIORKOR, 4501
- SECRETIN
  - ZOLLINGER-ELLISON SYNDROME, 4855*
- ZINC
  - CIRRHOSIS, 4791
  - HEMOCHROMATOSIS, 4791
  - HEPATITIS, 4791

BLOOD FLOW
- SEE CIRCULATION

BLOOD GROUP
- STOMACH
  - ACID SECRETION, 4367*

BLOOD VOLUME
- BILE
  - SULFOBROMOPHTHALEIN, 4135

BRADYKININ
- ENDOTOXIN
  - SHOCK, 4844*
- MESENTERY
  - CIRCULATION, 3940

BREAST FEEDING
- GASTROENTERITIS
  - DEHYDRATION, 4898
- LAXATIVES, 4873

BUDD-CHIARI SYNDROME
- CIRCULATION
  - NEOPLASMS, MALIGNANT, 4675

CALCIFICATION
- GALLBLADDER
  - DISEASES ASSOCIATED WITH, 4831
- LIVER
  - METASTASES, 4607
- PANCREATITIS, CHRONIC
  - ULTRASTRUCTURE, 4650

CALCIUM
- ABSORPTION
  - DRUG EFFECTS ON, 3994*
  - DUODENUM, 3994*, 4001
  - INTESTINE, 3977*, 4013
- GALLSTONE
  - CHEMICAL COMPOSITION, 4810, 4814
- METABOLISM
  - PANCREATITIS, 4639
- MOTILITY
  - COLON, 4035

CANCER
- SEE NEOPLASMS, MALIGNANT

CAPILLARIASIS
- LIVER
  - MORPHOLOGY, 4939
- RADIOLOGY, 4914*

CARBON TETRACHLORIDE
- LIVER INJURY
  - ALCOHOL, 4147
  - AMINES, 4136
  - PREVENTION, 4136

CARCINOGENS
- GASTROINTESTINAL TRACT, 4212
- METABOLISM
  - MICROORGANISMS, 4184
- OMENTUM, 4212

CARCINOIDS
- APPENDIX
  - SURGERY, 4581

CARRIER STATE
- AMEBIASIS, 4926
- ANTIGEN, AUSTRALIA
  - DRUG ADDICTION, 4756*
  - HEPATITIS, CHRONIC, 4756*
  - LIVER FUNCTION TESTS, 4756*

CATALASE
- ALCOHOL
  - METABOLISM, 4116*

CATECHOLAMINES
- ABSORPTION
  - DRUG EFFECTS ON, 3999
  - INTESTINE, 3999
- INTESTINE
  - ABSORPTION, 4004
- LIVER
  - CIRCULATION, 4143
  - METABOLISM, 4143
- METABOLISM
  - KWASHIORKOR, 4515
- MOTILITY
  - ILEUM, 4052
- PANCREAS
  - SECRETION, 4101
- STOMACH
  - SECRETION, 4073
  - ULCER, 4408

CATHARTICS
- SEE LAXATIVES

CECUM
- SEE ALSO LARGE INTESTINE
- AMEBIASIS
  - DRUG TREATMENT, 4929
- CROHNS DISEASE
  - MORPHOLOGY, 4479
- INTUSSUSCEPTION
  - ISCHEMIA, 4460
- NEOPLASMS, MALIGNANT, 4469

CELIAC DISEASE
- ALCOHOL

    - ABSORPTION, 4357
  - BILE ACIDS
    - CIRCULATION, 4803*
  - CHILDREN
    - GENETIC FACTORS, 4495*
  - DIET, 4521
  - EPIDEMIOLOGY, 4503
  - IMMUNOLOGY, 4496*, 4512
  - JEJUNUM
    - DISACCHARIDASE, 4497*
    - MORPHOLOGY, 4497*
  - SMALL INTESTINE
    - MORPHOLOGY, 4519

- LL
  - LIVER
    - POTASSIUM, 4132
    - ULTRASTRUCTURE, 4132

- EMICAL BURNS
  - ESOPHAGUS
    - DISEASES ASSOCIATED WITH, 4329
    - RADIOLOGY, 4296*

- EMICAL COMPOSITION
  - BILE
    - CHOLELITHIASIS, 4813
  - COLOSTRUM
    - IMMUNOGLOBULINS, 3931*
  - GALLSTONE, 4795*
    - CALCIUM, 4810, 4814
    - CHOLESTEROL, 4814
    - EPIDEMIOLOGY, 4817
    - FATTY ACIDS, 4810
  - GLYCOPROTEINS
    - INTESTINE, 3936
  - INTRINSIC FACTOR, 4068*
  - LARGE INTESTINE
    - MUCINS, 3966
  - LIPIDS
    - LIVER, 3926*
  - MOTILIN, 3963
  - SMALL INTESTINE
    - AGE FACTORS, 4200
  - STOMACH
    - PEPSIN, 4059
    - PEPSINOGEN, 4059

- EMOTHERAPY
  - GASTROINTESTINAL
    - NEOPLASMS, MALIGNANT, 4906
  - LIVER
    - METASTASES, 4662*, 4669*, 4674*

- ILDREN
  - SEE ALSO NEONATE, AGE FACTORS
  - AMEBIASIS
    - EPIDEMIOLOGY, 4919*, 4942
    - IMMUNOLOGY, 4942
  - ASCARIASIS
    - EPIDEMIOLOGY, 4917*
  - CELIAC DISEASE
    - GENETIC FACTORS, 4495*
  - CHOLECYSTITIS, 4826
  - CHOLELITHIASIS, 4812
  - CIRRHOSIS
    - ANGIOGRAPHY, 4263
  - DIARRHEA, 4910
    - ALKALOSIS, 4875
    - DISSACHARIDASE, 4835*
    - SEQUELAE, 4872
    - THERAPY, 4834*, 4869
  - DUODENUM
    - ULCER, 4396
  - FECES
    - BACTERIA, 4856
  - GASTROENTERITIS, 4901
    - MALABSORPTION, 4415*
  - HOOKWORM
    - EPIDEMIOLOGY, 4917*
  - ILEUS
    - THERAPY, 4454
  - INTESTINE
    - SECRETION, 4262
  - LACTOSE INTOLERANCE
    - ADAPTATION, 4499
    - DIETARY FACTORS, 4499
  - LIVER
    - FIBROSIS, 4681
  - PANCREAS
    - NEOPLASMS, MALIGNANT, 4601*
  - PANCREAS DISEASE, 4611
  - PARASITES AND PARASITIC DISEASE
    - EPIDEMIOLOGY, 4927, 4941
  - PEPTIC ULCER
    - SURGERY, 4396
  - RECTUM
    - BLEEDING, 4578
  - SUGAR
    - INTOLERANCE, 4886
  - ULCERATIVE COLITIS, 4591*
    - PROGNOSIS, 4598

- CHLORIDE
  - STOMACH
    - CITRIC ACID, 4070*

- CHOLANGIOGRAPHY
  - SEE ANGIOGRAPHY

- CHOLANGITIS, 4824

- CHOLECYSTECTOMY
  - BILE ACIDS
    - CIRCULATION, 4803*
  - SEQUELAE
    - FISTULA, 4821

- CHOLECYSTITIS
  - ADOLESCENTS, 4826
  - CHILDREN, 4826
  - CHOLELITHIASIS, 4801*
  - COMPLICATIONS, 4818
  - TRAUMA, 4796*

- CHOLECYSTOKININ
  - GALLBLADDER
    - MOTILITY, 4037
    - SECRETION, 4094*
  - PANCREAS
    - SECRETION, 4094*, 4096*
  - SMALL INTESTINE
    - PHOSPHATASE, ALKALINE, 4163*
  - STOMACH
    - ACID SECRETION, 4887

- CHOLEDOCHOLITHIASIS
  - THERAPY

    - HEPARIN, 4797*

- CHOLELITHIASIS
  - AGE FACTORS, 4795*
  - BILE
    - BILE ACIDS, 4806*
    - CHEMICAL COMPOSITION, 4813
    - DIETARY FACTORS, 4794*
    - LIPIDS, 4806*, 4808*
  - BILE ACIDS
    - METABOLISM, 4776*, 4808*
  - CHILDREN, 4812
  - CHOLECYSTITIS, 4801*
  - COMPLICATIONS, 4801*, 4818
  - DRUG TREATMENT, 4816
  - HERNIA, HIATUS
    - DIVERTICULUM, 4858
  - JAUNDICE, 4801*
  - LIVER DISEASE
    - DISEASES ASSOCIATED WITH, 4825
  - PANCREATITIS
    - ETIOLOGY, 4636
  - PARATHYROID GLAND
    - NEOPLASMS, BENIGN, 4800*
    - SECRETION, 4800*
  - RECURRENCE
    - ETIOLOGY, 4811
  - THERAPY
    - BILE ACIDS, 4794*

- CHOLERA, 4868
  - AMINO ACIDS
    - ABSORPTION, 4849*
  - CYCLIC ADENOSINE MONOPHOSPHATE
    - ANTIINFLAMMATORY AGENTS, 4195
  - GLUCOSE
    - ABSORPTION, 4849*
  - PROTEIN
    - SYNTHESIS, 4178
  - SMALL INTESTINE
    - MORPHOLOGY, 4413*
  - TOXIN
    - INHIBITION, 4003

- CHOLERETIC AGENTS
  - LIVER
    - DRUG METABOLISM, 4134

- CHOLESTASIS
  - BILE CANALICULI
    - ENZYMES, 4804*
  - BLOOD
    - LIPOPROTEINS, 4673*
  - FAMILIAL FACTORS, 4706
  - LIVER
    - HYALIN, 4664*
  - SMALL INTESTINE
    - ENZYMES, 4161*

- CHOLESTEROL
  - GALLSTONE
    - CHEMICAL COMPOSITION, 4814
    - PHYSICAL PROPERTIES, 4816
  - LIVER
    - NEOPLASMS, MALIGNANT, 4687
  - METABOLISM
    - BACTERIA, 4058*
    - INTESTINE, 4058*
    - LIVER, 4130, 4687
    - LIVER DISEASE, 4789
  - SYNTHESIS
    - CIRCADIAN RHYTHM, 4115*

- CHOLESTYRAMINE
  - ABSORPTION
    - BILE ACIDS, 4012
    - VITAMIN A, 4012

- CHOLINE
  - ABSORPTION
    - INTESTINE, 3981*
    - KINETICS, 3981*
  - ION TRANSPORT
    - TRACE ELEMENT, 4125

- CHROMATOGRAPHY
  - SMALL INTESTINE
    - HORMONE, 4193

- CHYME
  - SMALL INTESTINE
    - ENZYMES, 4197

- CIRCADIAN RHYTHM
  - BILE ACIDS
    - SYNTHESIS, 4115*
  - CHOLESTEROL
    - SYNTHESIS, 4115*
  - FATTY ACIDS
    - SYNTHESIS, 4115*
  - HORMONE
    - REGIONAL ENTERITIS, 4590*
    - ULCERATIVE COLITIS, 4590*
  - LIVER
    - MORPHOLOGY, 3949
  - NUCLEIC ACIDS
    - LIVER, 4129

- CIRCULATION
  - ABDOMEN, ACUTE
    - DISEASES ASSOCIATED WITH, 4569
  - BILE ACIDS
    - CELIAC DISEASE, 4803*
    - CHOLECYSTECTOMY, 4803*
  - CIRRHOSIS
    - NITROSAMINES, 4785
  - DUODENUM
    - MORPHOLOGY, 3951
  - GASTROINTESTINAL
    - METABOLISM, 4217
  - GASTROINTESTINAL TRACT
    - MORPHOLOGY, 4218
  - INTESTINE
    - DRUG EFFECTS ON, 4202*
    - SEROTONIN, 4201*
  - JEJUNUM
    - AMINO ACIDS, 4005
  - LIVER
    - CATECHOLAMINES, 4143
    - RETICULOENDOTHELIAL SYSTEM, 4222
  - LYMPH
    - LARGE INTESTINE, 4221
    - LIVER DISEASE, 4790
  - MESENTERY
    - BRADYKININ, 3940
    - HISTAMINE, 3940
  - MOTILITY
    - SMALL INTESTINE, 4028*

- MUSCULOSKELETAL SYSTEM
  - LIVER DISEASE, 4779*
- NEOPLASMS, MALIGNANT
  - BUDD-CHIARI SYNDROME, 4675
- NERVOUS CONTROL
  - LIVER DISEASE, 4779*
- PANCREAS
  - MORPHOLOGY, 3951
- PANCREATITIS
  - COMPLICATIONS, 4630*
- PEPTIC ULCER
  - DRUG EFFECTS ON, 4404
  - SEQUELAE, 4369*
- SMALL INTESTINE
  - ABSORPTION, 4206
  - MARKER STUDIES, 4205
- STOMACH
  - DRUG EFFECTS ON, 4204, 4404
  - MORPHOLOGY, 3958
- VASOPRESSIN
  - PANCREATITIS, 4632*

CIRRHOSIS
- ANGIOGRAPHY
  - CHILDREN, 4263
- ANTIGEN, AUSTRALIA
  - FAMILIAL FACTORS, 4755*
- ANTIINFLAMMATORY AGENTS, 4676
- BILE
  - LIPIDS, 4776*
- BILE ACIDS
  - METABOLISM, 4775*, 4776*
- BILE DUCT
  - MORPHOLOGY, 4769*
- BLOOD
  - ZINC, 4791
- CARBOHYDRATE
  - METABOLISM, 4765*
- DRUG TREATMENT
  - CORTICOSTEROIDS, 4788
- ETIOLOGY
  - HEPATITIS, CHRONIC, 4769*
- FETOPROTEIN, ALPHA, 4242
- GALACTOSAMINE
  - BILIARY DISEASE, 4793
  - NEOPLASMS, 4793
- IMMUNOLOGY
  - AGE FACTORS, 4771*, 4772*
  - FAMILIAL FACTORS, 4770*
  - GENETIC FACTORS, 4772*
  - REVIEWS, 4762
- LIVER
  - HYALIN, 4664*
  - MORPHOLOGY, 4770*, 4771*
- LIVER FUNCTION TESTS, 4774*
- NITROSAMINES
  - CIRCULATION, 4785

CIRRHOSIS, BILIARY
- ANTIGEN, AUSTRALIA
  - RADIOIMMUNOASSAY, 4781*
  - ULTRASTRUCTURE, 4781*
- BLOOD
  - PROTEIN, 4780*
- FIBRINOLYSIS, 4802*
- LYMPHOCYTE
  - TRANSFORMATION, 4778*

CITRIC ACID
- ACID SECRETION
  - STOMACH, 4070*
- CHLORIDE
  - STOMACH, 4070*

CLOTTING
- HEPATITIS, CHRONIC
  - LIVER FUNCTION TESTS, 4757*
- LIVER DISEASE, ALCOHOLIC, 4767

COLITIS
- SEE ALSO ULCERATIVE COLITIS
- CYSTS, 4564
- DYSENTERY
  - SEQUELAE, 4597
- ETIOLOGY
  - ISCHEMIA, 4533
- ISCHEMIA, 4551
  - ATHEROSCLEROSIS, 4573
  - KIDNEY TRANSPLANTATION, 4554
  - ORAL CONTRACEPTIVES, 4573
- RADIOLOGY, 4291

COLITIS, GRANULOMATOUS
- COMPLICATIONS
  - POLYPS, 4523*

COLLAGEN DISEASES
- ESOPHAGUS
  - PRESSURE STUDIES, 4294*

COLON
- SEE ALSO LARGE INTESTINE
- ABSORPTION
  - CONSTIPATION, 4526*
  - ELECTROLYTE, 3987*
  - WATER, 3987*
- COMPLICATIONS
  - KIDNEY TRANSPLANTATION, 4582
- CROHNS DISEASE
  - EPIDEMIOLOGY, 4587*
- DIVERTICULUM
  - BLEEDING, 4557
  - SURGERY, 4561
- ENDOSCOPY, 4233*, 4251, 4585
  - DIAGNOSIS, 4237
  - SURGERY, 4237
  - TECHNIQUES, 4260, 4266, 4553
- ION TRANSPORT
  - HORMONE CONTROL, 3978*
  - LAXATIVES, 4022
  - WATER, 4022
- KININS
  - DIVERTICULUM, 4589*
  - ULCERATIVE COLITIS, 4589*
- MOTILITY, 4042
  - CALCIUM, 4035
  - CYCLIC ADENOSINE MONOPHOSPHATE, 4035
  - DIET, 4051
  - PHOSPHODIESTERASE, 4035
- MUCOPOLYSACCHARIDE
  - METABOLISM, 4576
- MUCOSA
  - ULTRASTRUCTURE, 3930*
- NEOPLASMS, MALIGNANT
  - FAMILIAL FACTORS, 4525*
  - IMMUNOLOGY, 4851*
  - PERFORATION, 4552

- PERFUSION
  - BACTERIA, 4529*
- POLYPS
  - ENDOSCOPY, 4549
  - SURGERY, 4549
  - ULTRASTRUCTURE, 3930*
- PRESSURE STUDIES
  - DRUG EFFECTS ON, 4029

COLOSTOMY
- ULCERATIVE COLITIS, 4595

COLOSTRUM
- IMMUNOGLOBULINS
  - ABSORPTION, 3931*
  - CHEMICAL COMPOSITION, 3931*

COMA
- LIVER
  - ETIOLOGY, 4773*
  - IMMUNOLOGY, 4773*
  - MORPHOLOGY, 4773*
  - SURVIVAL, 4773*
  - THERAPY, 4694, 4733*, 4739*, 4792
- PORTACAVAL SHUNT
  - SEQUELAE, 4787

CONSTIPATION
- COLON
  - ABSORPTION, 4526*

CONSTITUTIONAL FACTORS
- DUODENUM
  - ULCER, 4391
- STOMACH
  - ACID SECRETION, 4367*

CONTRAST MEDIA
- BILE
  - EXCRETION, 4126
- GALLBLADDER
  - RADIOLOGY, 4287

COPPER
- ABSORPTION
  - DIETARY FACTORS, 3983*
  - INTESTINE, 3983*
- BILE
  - WILSONS DISEASE, 4665*
- BILE ACIDS
  - WILSONS DISEASE, 4667*
- LIVER
  - DIETARY FACTORS, 4154
- LYSOSOMES
  - WILSONS DISEASE, 4665*
- URINE
  - LIVER DISEASE, 4670*

CORTICOSTEROIDS
- CIRRHOSIS
  - DRUG TREATMENT, 4788
- DERMATITIS HERPETIFORMIS, 4419*
- HEPATITIS, CHRONIC
  - DRUG TREATMENT, 4758*
- IMMUNOGLOBULINS
  - METABOLISM, 4759*
- SMALL INTESTINE
  - MORPHOLOGY, 4519

CRIGLER-NAJJAR SYNDROME
- FAMILIAL FACTORS, 4705*

CROHNS DISEASE
- CECUM
  - MORPHOLOGY, 4479
- COLON
  - EPIDEMIOLOGY, 4587*
- COMPLICATIONS
  - UROGENITAL SYSTEM, 4481
- DIAGNOSIS, 4261
- DUODENUM, 4482
  - MORPHOLOGY, 4486
- ESOPHAGUS
  - MORPHOLOGY, 4486
- FOLIC ACID
  - MALABSORPTION, 4492*
- GASTROINTESTINAL
  - BLEEDING, 4480
- IMMUNOLOGY, 4512
- LARGE INTESTINE
  - PERFORATION, 4483
- MALABSORPTION
  - SURGERY, 4509
- MALNUTRITION
  - SURGERY, 4509
- MOUTH
  - MORPHOLOGY, 4485
- RECTUM
  - ION TRANSPORT, 4530*
- SMALL INTESTINE
  - PERFORATION, 4483
- STOMACH, 4482
  - MORPHOLOGY, 4486
- SURGERY
  - RECURRENCE, 4484
  - SEQUELAE, 4487
- UROGENITAL SYSTEM
  - FISTULA, 4481

CRYOTHERAPY
- GASTROINTESTINAL
  - BLEEDING, 4879
- STOMACH
  - BLEEDING, 4879

CYCLIC ADENOSINE MONOPHOSPHATE
- CHOLERA
  - ANTIINFLAMMATORY AGENTS, 4195
- INTESTINE
  - ANTIINFLAMMATORY AGENTS, 4195
- MOTILITY
  - COLON, 4035
  - SMALL INTESTINE, 4054
- STOMACH
  - ACID SECRETION, 4082

CYCLIC GUANOSINE MONOPHOSPHATE
- MOTILITY
  - STOMACH, 4041

CYSTIC FIBROSIS
- AMINO ACIDS
  - ABSORPTION, 4618
- GENETIC FACTORS, 4602*
- SMALL INTESTINE
  - RADIOLOGY, 4604*
- VITAMIN B12
  - MALABSORPTION, 4612

- CYSTS
  - BILE DUCT
    - DILATATION, 4827
    - MARKER STUDIES, 4288
    - RADIOLOGY, 4815
  - COLITIS, 4564
  - LARGE INTESTINE
    - OXYGEN, 4538
  - MESENTERY
    - ANGIOGRAPHY, 4874

- CYTOMEGALOVIRUS
  - HEPATITIS, VIRAL
    - ETIOLOGY, 4735*

- DEATH
  - SEE SURVIVAL

- DEFICIENCY
  - DIETARY FACTORS
    - MALABSORPTION, 4488*
  - FOLIC ACID
    - ALCOHOL, 4493*
    - MALABSORPTION, 4493*
  - GLUCOSE-6-PHOSPHATE DEHYDROGENASE
    - JAUNDICE, 4710
  - MAGNESIUM
    - PANCREAS DISEASE, 4615
  - PROTEIN
    - LIVER, 4127
  - TRACE ELEMENT
    - PANCREAS, 3932*
  - VITAMIN
    - PANCREATITIS, CHRONIC, 4640
  - VITAMIN A
    - MUCOPOLYSACCHARIDE, 4576

- DEHYDRATION
  - GASTROENTERITIS
    - BREAST FEEDING, 4898

- DERMATITIS HERPETIFORMIS
  - CORTICOSTEROIDS, 4419*
  - DIET, 4419*
  - IMMUNOLOGY, 4512
  - JEJUNUM
    - ABSORPTION, 4419*
    - MORPHOLOGY, 4419*

- DETOXIFICATION
  - HEPATECTOMY, 4139

- DIABETES
  - HYPERBILIRUBINEMIA
    - NEONATE, 4709
  - LIVER
    - GLYCOGEN, 4696
  - PANCREAS
    - NEOPLASMS, MALIGNANT, 4600*
  - PORTACAVAL SHUNT
    - SEQUELAE, 4787
  - SUGAR
    - ABSORPTION, 4019

- DIAGNOSIS
  - AMEBIASIS
    - IMMUNOLOGY, 4267
    - SCANNING, SCINTILLATION, 4915*
  - COLON
    - ENDOSCOPY, 4237
  - CROHNS DISEASE, 4261
  - ESOPHAGITIS, REFLUX, 4309, 4325
  - GALLBLADDER
    - MARKER STUDIES, 4250
    - SCANNING, SCINTILLATION, 4250
  - GASTROINTESTINAL
    - DISEASE, 4909
  - HEPATITIS, VIRAL
    - ANTIGEN, AUSTRALIA, 4258
  - HIRSCHSPRUNGS DISEASE
    - PRESSURE STUDIES, 4563
  - INTESTINE
    - OBSTRUCTION, 4548
  - LIVER
    - ANGIOGRAPHY, 4229*
    - NEOPLASMS, MALIGNANT, 4663*
    - SCANNING, SCINTILLATION, 4229*
  - LIVER DISEASE, 4670*
  - MALABSORPTION, 4505, 4514
  - MECKELS DIVERTICULUM
    - PERITONEOSCOPY, 4442
  - MEGACOLON
    - PRESSURE STUDIES, 4563
  - PANCREAS
    - PSEUDOCYST, 4282
  - PANCREATITIS, 4644
  - PANCREATITIS, CHRONIC, 4643
  - ULCERATIVE COLITIS, 4261
    - EPIDEMIOLOGY, 4587*
  - WILSONS DISEASE, 4670*

- DIALYSIS
  - KIDNEY
    - HEPATITIS, VIRAL, 4747
  - PERITONEUM
    - LIVER DISEASE, 4672*

- DIARRHEA
  - ALKALOSIS
    - CHILDREN, 4875
  - BACTERIA, 4881
  - BILE ACIDS
    - METABOLISM, 4114*
    - PHYSICAL PROPERTIES, 4421*
  - CHILDREN, 4910
    - DISSACHARIDASE, 4835*
    - SEQUELAE, 4872
  - DISEASES ASSOCIATED WITH
    - KIDNEY, 4875
  - ETIOLOGY
    - BILE ACIDS, 4423*
    - SUGAR, 4886
  - FECES
    - AMINO ACIDS, 4507
    - BACTERIA, 4856, 4857
  - INTESTINE
    - MICROORGANISMS, 4900
  - PROTEIN
    - METABOLISM, 4507
  - SALMONELLOSIS
    - GASTROENTEROSTOMY, 4867
  - SMALL INTESTINE
    - HISTOLOGY, 4431
    - MORPHOLOGY, 4835*, 4853*
  - THERAPY
    - CHILDREN, 4834*, 4869
  - THYROID
    - NEOPLASMS, MALIGNANT, 4892

- DIET
  - BILE ACIDS
    - MALABSORPTION, 4491*
    - SECRETION, 4118*
  - CELIAC DISEASE, 4521
  - DERMATITIS HERPETIFORMIS, 4419*
  - LACTOSE INTOLERANCE
    - PREGNANCY, 4516
  - MOTILITY
    - COLON, 4051
  - PANCREATITIS, CHRONIC, 4640
  - PROTEASE
    - PANCREAS, 4093*

- DIETARY FACTORS
  - APPENDICITIS
    - ETIOLOGY, 4579
  - BILE
    - CHOLELITHIASIS, 4794*
  - COPPER
    - ABSORPTION, 3983*
  - DEFICIENCY
    - MALABSORPTION, 4488*
  - ESOPHAGUS
    - PRESSURE STUDIES, 4297*
  - FOLIC ACID
    - METABOLISM, 4170
  - GASTRIN
    - SYNTHESIS, 4063*
  - HEARTBURN
    - ETIOLOGY, 4295*
  - INTESTINE
    - IRON, 3939
  - IRON
    - ION TRANSPORT, 3997
  - LACTOSE INTOLERANCE
    - CHILDREN, 4499
  - LIVER
    - COPPER, 4154
    - ENZYMES, 4138
    - MICROSOMES, 4138
    - REGENERATION, 3962
    - SECRETION, 4056*
    - ULTRASTRUCTURE, 4216
  - PANCREAS
    - SECRETION, 4056*
  - PEPTIC ULCER
    - ACID SECRETION, 4383
  - SMALL INTESTINE
    - EMBRYOLOGY, 4200
  - STOMACH
    - ACID SECRETION, 4383
  - VITAMIN A
    - METABOLISM, 4194
  - ZINC
    - ABSORPTION, 3983*
    - SECRETION, 4099*

- DIGESTION
  - PANCREAS
    - SECRETION, 4106

- DILATATION
  - BILE DUCT
    - CYSTS, 4827

- DISACCHARIDASE
  - SEE ALSO LACTASE
  - JEJUNUM
    - CELIAC DISEASE, 4497*
    - LACTOSE INTOLERANCE, 4504

- DISEASES ASSOCIATED WITH
  - ABDOMEN, ACUTE
    - CIRCULATION, 4569
  - ANTIGEN, AUSTRALIA
    - NEOPLASMS, MALIGNANT, 4745
  - ANUS
    - NEOPLASMS, MALIGNANT, 4536
  - DIARRHEA
    - KIDNEY, 4875
  - DUODENUM
    - ANOMALY, 4500
  - ENTEROCOLITIS, NECROTIZING
    - LEUKEMIA, 4861
  - ESOPHAGITIS, REFLUX
    - PEPTIC ULCER, 4320
    - RESPIRATORY SYSTEM, 4318
  - ESOPHAGUS
    - ATRESIA, 4314
    - CHEMICAL BURNS, 4329
  - GALLBLADDER
    - CALCIFICATION, 4831
    - NEOPLASMS, MALIGNANT, 4831
  - GASTROINTESTINAL
    - BLEEDING, 4880
  - HERNIA, HIATUS
    - MUSCULOSKELETAL SYSTEM, 4321
  - KWASHIORKOR
    - ANEMIA, 4502, 4888
  - LIVER
    - HEMATOPOIESIS, 4661*
    - NEOPLASMS, MALIGNANT, 4693
  - LIVER DISEASE
    - CHOLELITHIASIS, 4825
  - MALABSORPTION
    - BACTERIA, 4500
  - MALNUTRITION
    - PANCREATITIS, 4517
  - PANCREATITIS
    - MUSCULOSKELETAL SYSTEM, 4656
  - PEPTIC ULCER
    - ENDOCRINE SYSTEM, 4395
    - NEOPLASMS, MALIGNANT, 4346
  - PORTAL HYPERTENSION, 4661*
  - RECTUM
    - NEOPLASMS, MALIGNANT, 4536
  - STEATORRHEA
    - NEOPLASMS, MALIGNANT, 4456
  - ULCERATIVE COLITIS
    - NEOPLASMS, MALIGNANT, 4592

- DISSACHARIDASE
  - DIARRHEA
    - CHILDREN, 4835*

- DIVERTICULUM
  - BILE DUCT
    - ANGIOGRAPHY, 4829
  - COLON
    - BLEEDING, 4557
    - KININS, 4589*
    - SURGERY, 4561
  - DUODENUM, 4428, 4474
  - HERNIA, HIATUS
    - CHOLELITHIASIS, 4858
  - JEJUNUM
    - PERFORATION, 4430, 4459

    - RUPTURE, 4444
  - LARGE INTESTINE
    - BLEEDING, 4565
    - EPIDEMIOLOGY, 4570
    - SURGERY, 4565

- DRAINAGE
  - DUMPING SYNDROME
    - ETIOLOGY, 4382
  - GASTROINTESTINAL
    - BLEEDING, 4799*
  - LIVER
    - TRAUMA, 4133
  - PANCREAS
    - ABSCESS, 4634
  - PEPTIC ULCER
    - SURGERY, 4365*

- DRUG
  - FOLIC ACID
    - ABSORPTION, 4492*

- DRUG ABSORPTION
  - GASTROINTESTINAL
    - ANTICHOLINERGIC AGENTS, 4011
  - GASTROINTESTINAL TRACT
    - MARKER STUDIES, 4010
  - INTESTINE
    - AGE FACTORS, 4009
    - PHYSICAL FACTORS, 3990*
  - VILLI
    - ATROPHY, 4490*

- DRUG ADDICTION
  - ANTIGEN, AUSTRALIA
    - CARRIER STATE, 4756*
  - HEPATITIS, VIRAL, 4729*
  - LIVER
    - INJURY, 4720

- DRUG EFFECTS ON
  - ABSORPTION
    - CATECHOLAMINES, 3999
  - ALCOHOL
    - FATTY LIVER, 4124*
  - AMINO ACIDS
    - ION TRANSPORT, 3995*
  - CALCIUM
    - ABSORPTION, 3994*
  - ESOPHAGITIS, REFLUX, 4298*
    - PRESSURE STUDIES, 4328
  - GALLBLADDER
    - TRANSPORT, 4017
  - INTESTINE
    - CIRCULATION, 4202*
  - LIVER
    - REGENERATION, 4144, 4145
    - REVIEWS, 4691
    - ULTRASTRUCTURE, 3948
  - MOTILITY
    - GALLBLADDER, 4036
    - INTESTINE, 4027*
    - LARGE INTESTINE, 4030
    - RECTUM, 4049
    - STOMACH, 4027*
  - NUCLEIC ACIDS
    - LIVER, 4129
  - PANCREAS
    - ABSORPTION, 4098*
    - PROTEIN, 4098*
    - SECRETION, 4098*
  - PEPTIC ULCER
    - CIRCULATION, 4404
  - PRESSURE STUDIES
    - COLON, 4029
  - SECRETION
    - STOMACH, 4071*
  - STOMACH
    - CIRCULATION, 4204, 4404
  - SUGAR
    - ABSORPTION, 4019

- DRUG METABOLISM
  - LIVER
    - CHOLERETIC AGENTS, 4134
    - ENZYMES, 4151
    - INJURY, 4131
    - JAUNDICE, OBSTRUCTIVE, 4137
    - MICROSOMES, 4127
    - SPECIES DIFFERENCES, 4137
  - SMALL INTESTINE
    - PHENOBARBITAL, 4196

- DRUG TREATMENT
  - BILE ACIDS
    - MALABSORPTION, 4491*
  - CECUM
    - AMEBIASIS, 4929
  - CHOLELITHIASIS, 4816
  - CIRRHOSIS
    - CORTICOSTEROIDS, 4788
  - ENTEROCOLITIS
    - ANTIBIOTICS, 4884
  - GASTRITIS
    - AMINO ACIDS, 4388
  - GASTROENTERITIS
    - ANTIBIOTICS, 4891
  - HEPATITIS, CHRONIC
    - CORTICOSTEROIDS, 4758*
    - IMMUNOSUPPRESSION, 4758*
  - HYPOGLYCEMIA, 4902
  - INTESTINE
    - AMEBIASIS, 4935, 4940
    - GIARDIASIS, 4935
  - LIVER
    - AMEBIASIS, 4929, 4930
    - SCHISTOSOMIASIS, 4932
  - PARASITES AND PARASITIC DISEASE, 4928
  - PEPTIC ULCER, 4378
    - AMINO ACIDS, 4388
    - PREVENTION, 4411
  - PROTEIN
    - INTOLERANCE, 4513
  - SCHISTOSOMIASIS
    - LIVER, 4931
  - STOMACH
    - EROSIONS, 4411
  - WILSONS DISEASE
    - BILE ACIDS, 4667*

- DRUGS
  - GASTROINTESTINAL
    - BLEEDING, 4359
  - JEJUNUM
    - NEOPLASMS, MALIGNANT, 4456
  - STEATORRHEA, 4456
  - STOMACH
    - INJURY, 3970

  - ULCER, 4390

DUBIN-JOHNSON SYNDROME
- GENETIC FACTORS, 4703*
- MARKER STUDIES, 4704*
- ORAL CONTRACEPTIVES, 4703*
- PREGNANCY, 4703*
- SULFOBROMOPHTHALEIN, 4704*

DUMPING SYNDROME
- ETIOLOGY
  - DRAINAGE, 4382

DUODENUM
- SEE ALSO SMALL INTESTINE
- ABSORPTION
  - CALCIUM, 4001
  - MAGNESIUM, 4001
- ANOMALY
  - DISEASES ASSOCIATED WITH, 4500
- ANOMALY, CONGENITAL
  - SURGERY, 4425
- CALCIUM
  - ABSORPTION, 3994*
- CIRCULATION
  - MORPHOLOGY, 3951
- CROHNS DISEASE, 4482
  - MORPHOLOGY, 4486
- DIVERTICULUM, 4428, 4474
- ENZYMES
  - SYNTHESIS, 4160*
- FISTULA
  - JAUNDICE, OBSTRUCTIVE, 4451
- KINETICS, CELL
  - VITAMIN D, 4164*
- MORPHOLOGY
  - GASTROENTERITIS, 4415*
- NEOPLASMS, MALIGNANT
  - METASTASES, 4463
  - PEPTIC ULCER, 4384
  - SURGERY, 4427
- PERFORATION
  - ENDOSCOPY, 4439
- PRESSURE STUDIES
  - PERISTALSIS, 4046
- RUPTURE
  - GANGRENE, 4464
  - TRAUMA, 4455
- TELANGIECTASIA
  - BLEEDING, 4468
- TRAUMA
  - HEMATOMA, 4437
- ULCER
  - ACID SECRETION, 4385, 4386, 4391, 4401
  - AGE FACTORS, 4391
  - ALKALOSIS, 4401
  - ANEMIA, SICKLE CELL, 4403
  - ANESTHETICS, LOCAL, 4377
  - ANTACIDS, 4377
  - CHILDREN, 4396
  - CONSTITUTIONAL FACTORS, 4391
  - ENDOSCOPY, 4381
  - EPIDEMIOLOGY, 4385
  - GASTRIN, 4397
  - HEALING, 4381
  - ISCHEMIA, 4403
  - PEPSIN SECRETION, 4405
  - PERFORATION, 4370*, 4459
  - RECURRENCE, 4406
  - SEQUELAE, 4385
  - SIMULATION, 4370*
  - SURGERY, 4382, 4393, 4394
  - VAGOTOMY, 4387

DUODENUM ULCER
- SEE ALSO PEPTIC ULCER

DYSENTERY
- BACTERIA
  - ANTIBACTERIALS, 4933
- IMMUNOLOGY
  - SHIGELLOSIS, 4865
- SEQUELAE
  - COLITIS, 4597
- SHIGELLOSIS, 4866

DYSKINESIA
- ESOPHAGUS, 4323

DYSPEPSIA
- SURGERY, 4333

ELECTRICAL CONTROL
- MOTILITY
  - LARGE INTESTINE, 4030

ELECTROLYTE
- ABSORPTION
  - COLON, 3987*
- MOTILITY
  - ILEUM, 4052
- PANCREAS
  - SECRETION, 4107
- SALIVA
  - SECRETION, 4060
- STOMACH
  - SECRETION, 4087

ELECTROPHYSIOLOGY
- ILEUM, 4034
- INTESTINE
  - PERISTALSIS, 4047
- MOTILITY
  - ANUS, 4032
  - BILIARY TRACT, 4031
- OBESITY
  - SURGERY, 4575
- PERISTALSIS, 4045
- SALIVARY GLANDS, 4219, 4220
- SMALL INTESTINE, 4043
- STOMACH
  - ACID SECRETION, 4078
  - MUCOSA, 3925*

EMBRYOLOGY
- GLUCAGON
  - METABOLISM, 4100
- PANCREAS
  - CELLS, 3937
- SMALL INTESTINE
  - DIETARY FACTORS, 4200

EMESIS
- SEE VOMITING

ENDOCRINE SYSTEM
- HORMONE

-
  -
    - LIVER DISEASE, ALCOHOLIC, 4764*
  - INTESTINE
    - ABSORPTION, 3989*
  - MACROMOLECULE
    - ABSORPTION, 3989*
  - PEPTIC ULCER
    - DISEASES ASSOCIATED WITH, 4395
  - STOMACH
    - MUCOSA, 3973

- ENDOMETRIOSIS
  - LARGE INTESTINE
    - SURGERY, 4567
  - SMALL INTESTINE
    - SURGERY, 4567

- ENDOSCOPY
  - BILE DUCT, 4252
  - BILIARY TRACT, 4380
  - COLON, 4233*, 4251, 4585
    - DIAGNOSIS, 4237
    - POLYPS, 4549
    - SURGERY, 4237
    - TECHNIQUES, 4260, 4266, 4553
  - DUODENUM
    - PERFORATION, 4439
    - ULCER, 4381
  - ESOPHAGUS, 4273
    - COMPLICATIONS, 4274
  - GASTRITIS, 4272
  - GASTROINTESTINAL, 4256
    - BLEEDING, 4232*, 4239, 4268
  - LARGE INTESTINE
    - PNEUMATOSIS, 4543
  - PANCREATIC DUCT, 4252, 4259, 4380
  - SIGMOID, 4270
  - SMALL INTESTINE, 4380
  - STOMACH, 4240, 4277
    - COMPLICATIONS, 4399, 4439
    - NEOPLASMS, MALIGNANT, 4285, 4336
    - PEPTIC ULCER, 4399
    - ULCER, 4271, 4400

- ENDOTOXIN
  - SHOCK
    - BRADYKININ, 4844*
    - HISTAMINE, 4844*
    - SEROTONIN, 4844*

- ENTAMOEBA HISTOLYTICA
  - CULTURE, 4916*

- ENTERITIS
  - SEE ALSO REGIONAL ENTERITIS
  - PREVENTION
    - VACCINE, 4878
  - SEQUELAE
    - SPRUE, 4508

- ENTEROCOLITIS
  - BACTERIA, 4884
    - TRANSMISSION, 4556
  - DRUG TREATMENT
    - ANTIBIOTICS, 4884
  - TRANSFUSION
    - ISCHEMIA, 4586
    - NEONATE, 4586

- ENTEROCOLITIS, NECROTIZING
  - DISEASES ASSOCIATED WITH
    - LEUKEMIA, 4861
  - SALMONELLOSIS
    - PREMATURITY, 4843*

- ENVIRONMENTAL FACTORS
  - INTESTINE
    - MICROORGANISMS, 4186

- ENZYMES
  - BILE CANALICULI
    - CHOLESTASIS, 4804*
  - DRUG METABOLISM
    - LIVER, 4151
  - GLYCOLYSIS
    - SMALL INTESTINE, 4188
  - JEJUNUM
    - CARBOHYDRATE, 4162*
  - LIVER
    - ALCOHOL, 4123*
    - DIETARY FACTORS, 4138
    - HEPATECTOMY, 4155
    - ISCHEMIA, 3952
    - MITOCHONDRIA, 3968
    - SCHISTOSOMIASIS, 4932
  - LIVER FUNCTION TESTS
    - LIVER DISEASE, 4269
  - PANCREAS
    - ILEOSTOMY, 4438
    - MAGNESIUM, 4615
    - MALNUTRITION, 4517
    - PANCREAS DISEASE, 4641
    - PANCREATITIS, 4641
    - SECRETION, 4106, 4603*
  - SMALL INTESTINE
    - AGE FACTORS, 4174, 4198
    - CHOLESTASIS, 4161*
    - CHYME, 4197
    - MUCOSA, 3967
    - SURGERY, 4168*
    - ULTRASTRUCTURE, 4160*
  - STOMACH
    - ACHLORHYDRIA, 4361
    - MITOCHONDRIA, 3968
    - MUCOSA, 3961
    - NEOPLASMS, MALIGNANT, 4361
    - PEPTIC ULCER, 4361
    - VAGOTOMY, 4402
  - SYNTHESIS
    - DUODENUM, 4160*

- EPIDEMIOLOGY
  - AMEBIASIS
    - CHILDREN, 4919*, 4942
    - IMMUNOLOGY, 4919*
    - TRANSMISSION, 4926
  - ANTIGEN, AUSTRALIA, 4731*
    - FAMILIAL FACTORS, 4745
    - MALNUTRITION, 4744
  - ASCARIASIS, 4918*
    - CHILDREN, 4917*
  - CELIAC DISEASE, 4503
  - CROHNS DISEASE
    - COLON, 4587*
  - DUODENUM
    - ULCER, 4385
  - GALLSTONE
    - CHEMICAL COMPOSITION, 4817
  - GIARDIASIS, 4922*

  - HOOKWORM, 4918*
    - CHILDREN, 4917*
  - LARGE INTESTINE
    - DIVERTICULUM, 4570
    - POLYPS, 4570
  - PANCREAS
    - NEOPLASMS, MALIGNANT, 4600*, 4608
  - PARASITES AND PARASITIC DISEASE, 4924
    - AGE FACTORS, 4927
    - CHILDREN, 4927, 4941
  - STOMACH
    - NEOPLASMS, MALIGNANT, 4350, 4608
    - ULCER, 4389
  - TRICHURIASIS, 4918*
  - ULCERATIVE COLITIS
    - DIAGNOSIS, 4587*

- EROSIONS
  - STOMACH
    - DRUG TREATMENT, 4411

- ESOPHAGITIS, REFLUX
  - DIAGNOSIS, 4309, 4325
  - DISEASES ASSOCIATED WITH
    - PEPTIC ULCER, 4320
    - RESPIRATORY SYSTEM, 4318
  - DRUG EFFECTS ON, 4298*
  - PRESSURE STUDIES
    - DRUG EFFECTS ON, 4328
  - SURGERY, 4325, 4354
    - TECHNIQUES, 4303, 4310

- ESOPHAGUS
  - ATRESIA
    - DISEASES ASSOCIATED WITH, 4314
  - CHEMICAL BURNS
    - DISEASES ASSOCIATED WITH, 4329
    - RADIOLOGY, 4296*
  - CROHNS DISEASE
    - MORPHOLOGY, 4486
  - DYSKINESIA, 4323
  - ENDOSCOPY, 4273
    - COMPLICATIONS, 4274
  - FISTULA
    - SURGERY, 4313
  - MOTILITY
    - PRESSURE STUDIES, 4033
  - NEOPLASMS, MALIGNANT, 4306
    - CYTOLOGY, 4326, 4327
    - METASTASES, 4308
    - RADIATION, 4301
    - RADIOLOGY, 4300
    - RADIOTHERAPY, 4302, 4317
    - SURGERY, 4301, 4302, 4313
    - SURVIVAL, 4319
  - PERFORATION, 4315
  - POLYPS
    - SURGERY, 4305, 4343
  - PRESSURE STUDIES, 4316
    - COLLAGEN DISEASES, 4294*
    - DIETARY FACTORS, 4297*
    - HERNIA, HIATUS, 4324
    - HORMONE EFFECTS ON, 4025*
    - VAGOTOMY, 4324, 4407
  - SPHINCTER
    - MORPHOLOGY, 4040
    - PRESSURE STUDIES, 4040
    - RADIOLOGY, 4040
  - SURGERY
    - TECHNIQUES, 4307, 4311
  - TRIGLYCERIDE
    - INTOLERANCE, 4297*
  - VARICES
    - BLEEDING, 4330, 4777*
    - VASOPRESSIN, 4777*

- ETHIONINE
  - LIVER
    - ULTRASTRUCTURE, 3945

- ETHNIC FACTORS
  - PEPTIC ULCER
    - ACID SECRETION, 4386

- EVOLUTION
  - GASTROINTESTINAL
    - HORMONE, 4209

- EXCRETION
  - BILE
    - CONTRAST MEDIA, 4126
  - GASTRIN
    - KIDNEY, 4067*

- FAMILIAL FACTORS
  - ANTIGEN, AUSTRALIA
    - EPIDEMIOLOGY, 4745
  - CHOLESTASIS, 4706
  - CIRRHOSIS
    - ANTIGEN, AUSTRALIA, 4755*
    - IMMUNOLOGY, 4770*
  - COLON
    - NEOPLASMS, MALIGNANT, 4525*
  - CRIGLER-NAJJAR SYNDROME, 4705*
  - HEPATITIS, CHRONIC
    - ANTIGEN, AUSTRALIA, 4755*
  - HEPATITIS, NONVIRAL, 4718
  - LIVER
    - FIBROSIS, 4671*
    - NEOPLASMS, MALIGNANT, 4755*
  - PANCREATITIS
    - SURGERY, 4651
  - PANCREATITIS, CHRONIC
    - SURGERY, 4645
  - ULCERATIVE COLITIS
    - MUSCULOSKELETAL SYSTEM, 4594

- FATS
  - SEE LIPIDS, TRIGLYCERIDES

- FATTY ACIDS
  - FECES
    - IMMUNOSUPPRESSION, 4203*
  - GALLSTONE
    - CHEMICAL COMPOSITION, 4810
  - METABOLISM
    - AGE FACTORS, 4176
    - SMALL INTESTINE, 4176
  - SYNTHESIS
    - CIRCADIAN RHYTHM, 4115*

- FATTY LIVER
  - ALCOHOL
    - DRUG EFFECTS ON, 4124*
    - INHIBITION, 4668*
    - LIPOPROTEINS, 4117*
  - CARBOHYDRATE
    - METABOLISM, 4765*

- LIPIDS
  - METABOLISM, 4668*

FECES
- AMINO ACIDS
  - DIARRHEA, 4507
- ANTIGEN, AUSTRALIA
  - INHIBITION, 4727*
- BACTERIA
  - ANTIBACTERIALS, 4211
  - CHILDREN, 4856
  - DIARRHEA, 4856, 4857
- FATTY ACIDS
  - IMMUNOSUPPRESSION, 4203*
- PIGMENTATION
  - FOOD ADDITIVES, 4903

FETOPROTEIN, ALPHA
- CIRRHOSIS, 4242
- LIVER
  - NEOPLASMS, MALIGNANT, 4241

FIBRINOLYSIS
- CIRRHOSIS, BILIARY, 4802*
- JAUNDICE, OBSTRUCTIVE, 4802*

FIBROSIS
- LIVER
  - CHILDREN, 4681
  - FAMILIAL FACTORS, 4671*
  - HYPOXIA, 4681
  - SCHISTOSOMIASIS, 4921*

FISTULA
- ANUS
  - ABSCESS, 4574
  - SEPSIS, 4574
- BILE DUCT
  - BILEMIA, 4798*
- BILIARY
  - JAUNDICE, OBSTRUCTIVE, 4451
- BILIARY TRACT
  - RADIOLOGY, 4821
- CHOLECYSTECTOMY
  - SEQUELAE, 4821
- DUODENUM
  - JAUNDICE, OBSTRUCTIVE, 4451
- ESOPHAGUS
  - SURGERY, 4313
- LARGE INTESTINE
  - KIDNEY, 4546
  - UROGENITAL SYSTEM, 4545, 4584
- SMALL INTESTINE, 4434, 4462
  - FOREIGN BODIES, 4443
  - UROGENITAL SYSTEM, 4545
- UROGENITAL SYSTEM
  - CROHNS DISEASE, 4481

FLUORIDE
- ACID SECRETION
  - STOMACH, 4074

FOLIC ACID
- ABSORPTION
  - DRUG, 4492*
  - SMALL INTESTINE, 3975*
- DEFICIENCY
  - ALCOHOL, 4493*
  - MALABSORPTION, 4493*
- MALABSORPTION
  - CROHNS DISEASE, 4492*
  - ULCERATIVE COLITIS, 4492*
- METABOLISM
  - DIETARY FACTORS, 4170
  - JEJUNUM, 4170
  - LIVER, 4170
  - STEROID, 4170

FOOD ADDITIVES
- FECES
  - PIGMENTATION, 4903
- STOMACH
  - NEOPLASMS, MALIGNANT, 4342
- TOXICITY, 4210

FOREIGN BODIES
- PERITONEUM
  - ADHESIONS, 4889
- PERITONITIS, 4883, 4907
  - ANTIINFLAMMATORY AGENTS, 4911
  - IMMUNOLOGY, 4885
- SMALL INTESTINE
  - FISTULA, 4443

FUNGUS
- LIVER
  - ABSCESS, 4724
- SMALL INTESTINE
  - SPRUE, TROPICAL, 4510

GALACTOSAMINE
- CIRRHOSIS
  - BILIARY DISEASE, 4793
  - NEOPLASMS, 4793

GALACTOSE
- INTOLERANCE
  - PORPHYRIA, 4905
- METABOLISM
  - SMALL INTESTINE, 4183

GALLBLADDER
- ANOMALY, CONGENITAL, 4823
  - RADIOLOGY, 4820
- CALCIFICATION
  - DISEASES ASSOCIATED WITH, 4831
- DIAGNOSIS
  - MARKER STUDIES, 4250
  - SCANNING, SCINTILLATION, 4250
- MOTILITY
  - CHOLECYSTOKININ, 4037
  - DRUG EFFECTS ON, 4036
  - NERVOUS CONTROL, 4036
- NEOPLASMS, BENIGN
  - RADIOLOGY, 4833
- NEOPLASMS, MALIGNANT
  - DISEASES ASSOCIATED WITH, 4831
- RADIOLOGY
  - CONTRAST MEDIA, 4287
- SECRETION
  - CHOLECYSTOKININ, 4094*
  - PANCREOZYMIN, 4094*
- TRANSPORT
  - DRUG EFFECTS ON, 4017
  - WATER, 4017

GALLSTONE
- CHEMICAL COMPOSITION, 4795*

    - CALCIUM, 4810, 4814
    - CHOLESTEROL, 4814
    - EPIDEMIOLOGY, 4817
    - FATTY ACIDS, 4810
  - CHOLESTEROL
    - PHYSICAL PROPERTIES, 4816
  - ILEUS, 4435

- GANGRENE
  - DUODENUM
    - RUPTURE, 4464

- GASTRECTOMY
  - SEE ALSO ANTRECTOMY
  - ALCOHOL
    - ABSORPTION, 4357
  - MALABSORPTION
    - SURGERY, 4498*
  - SEQUELAE
    - HEMATOLOGY, 4364*
    - MALABSORPTION, 4364*
  - VITAMIN B12
    - ABSORPTION, 4366*

- GASTRIN
  - BLOOD
    - SHOCK, 4081
    - ZOLLINGER-ELLISON SYNDROME, 4848*, 4854*, 4855*, 4890
  - DUODENUM
    - ULCER, 4397
  - EXCRETION
    - KIDNEY, 4067*
  - HORMONE CONTROL
    - ZOLLINGER-ELLISON SYNDROME, 4854*
  - METABOLISM
    - KIDNEY, 4067*, 4075
    - NERVOUS CONTROL, 4080
  - PEPTIC ULCER
    - SURGERY, 4397
  - SECRETION
    - HORMONE CONTROL, 4852*
  - SERUM
    - RADIOIMMUNOASSAY, 4246
  - SYNTHESIS
    - ANTRECTOMY, 4063*
    - DIETARY FACTORS, 4063*
  - THYROID
    - NEOPLASMS, MALIGNANT, 4852*
  - ZOLLINGER-ELLISON SYNDROME
    - PROGNOSIS, 4841*

- GASTRITIS
  - ACID SECRETION
    - IMMUNOSUPPRESSION, 4332*
  - BACTERIA
    - PANCREATITIS, CHRONIC, 4653
  - BIOPSY, 4272
  - BLEEDING
    - ANGIOGRAPHY, 4363*
    - VASOPRESSIN, 4363*
  - DRUG TREATMENT
    - AMINO ACIDS, 4388
  - ENDOSCOPY, 4272
  - ETIOLOGY
    - BILE, 4338
  - MORPHOLOGY
    - IMMUNOSUPPRESSION, 4332*
  - STRESS
    - SIMULATION, 4373*

- GASTRITIS, ATROPHIC
  - MORPHOLOGY
    - MARKER STUDIES, 4379
  - REVIEWS, 4337

- GASTRITIS, REFLUX
  - SURGERY, 4354

- GASTROENTERITIS
  - BACTERIA
    - TRANSMISSION, 4836*, 4850*
  - CHILDREN, 4901
  - DEHYDRATION
    - BREAST FEEDING, 4898
  - DRUG TREATMENT
    - ANTIBIOTICS, 4891
  - DUODENUM
    - MORPHOLOGY, 4415*
  - MALABSORPTION
    - CHILDREN, 4415*

- GASTROENTEROSTOMY
  - DIARRHEA
    - SALMONELLOSIS, 4867

- GASTROINTESTINAL
  - ABSORPTION
    - ANTIINFLAMMATORY AGENTS, 4002
  - BLEEDING
    - ANTACIDS, 4339
    - ASPIRIN, 4863
    - CROHNS DISEASE, 4480
    - CRYOTHERAPY, 4879
    - DISEASES ASSOCIATED WITH, 4880
    - DRAINAGE, 4799*
    - DRUGS, 4359
    - ENDOSCOPY, 4232*
    - NEOPLASMS, MALIGNANT, 4348
    - STRESS, 4339, 4348
    - SURGERY, 4880
    - SURVIVAL, 4376
    - TELANGIECTASIA, 4465
    - THERAPY, 4376
  - DISEASE
    - DIAGNOSIS, 4909
    - GIARDIASIS, 4922*
    - LIPIDS, 4846*
    - THERAPY, 4846*
  - DRUG ABSORPTION
    - ANTICHOLINERGIC AGENTS, 4011
  - ENDOSCOPY, 4256
    - BLEEDING, 4239, 4268
  - HORMONE
    - EVOLUTION, 4209
  - METABOLISM
    - CIRCULATION, 4217
  - MICROORGANISMS
    - ANTIBIOTICS, 4215
  - MOTILITY
    - HORMONE EFFECTS ON, 4023*
    - NERVOUS CONTROL, 4053
  - NEOPLASMS, MALIGNANT
    - BIOPSY, 4275
    - CHEMOTHERAPY, 4906
    - CYTOLOGY, 4275
    - IMMUNOLOGY, 4528*, 4547
  - SCLERODERMA, 4864

- STRICTURE
  - CYTOLOGY, 4276
- TUBERCULOSIS
  - RADIOLOGY, 4842*

GASTROINTESTINAL TRACT
- CARCINOGENS, 4212
- DRUG ABSORPTION
  - MARKER STUDIES, 4010
- MORPHOLOGY
  - CIRCULATION, 4218
  - NERVOUS SYSTEM, 4218
- PERFUSION
  - TECHNIQUES, 4224
- PROSTAGLANDIN, 4895

GASTRONE
- ANTIBODIES
  - IMMUNOGLOBULINS, 4062*
- STOMACH
  - IMMUNOFLUORESCENCE, 3924*
  - SECRETION, 4062*

GAUCHERS DISEASE
- LIVER, 4692

GENETIC FACTORS
- CELIAC DISEASE
  - CHILDREN, 4495*
- CIRRHOSIS
  - IMMUNOLOGY, 4772*
- CYSTIC FIBROSIS, 4602*
- DUBIN-JOHNSON SYNDROME, 4703*
- LACTOSE INTOLERANCE, 4494*
- SALIVA
  - PROTEIN, 4214

GIARDIASIS
- EPIDEMIOLOGY, 4922*
- GASTROINTESTINAL
  - DISEASE, 4922*
- INTESTINE
  - DRUG TREATMENT, 4935
- VITAMIN B12
  - MALABSORPTION, 4913*

GLUCAGON
- METABOLISM
  - EMBRYOLOGY, 4100

GLUCONEOGENESIS
- JEJUNUM, 4157*

GLUCOSE
- ABSORPTION
  - CHOLERA, 4849*
  - INTESTINE, 3980*, 4014
- INTESTINE
  - ABSORPTION, 3998
- METABOLISM
  - SMALL INTESTINE, 4182, 4187, 4188
- SECRETION
  - PANCREAS, 4091*
- SMALL INTESTINE
  - ISCHEMIA, 4447

GLUCOSE-6-PHOSPHATASE
- SMALL INTESTINE
  - SUGAR, 4177

GLUCOSE-6-PHOSPHATE DEHYDROGENASE
- DEFICIENCY
  - JAUNDICE, 4710

GLUCURONIDASE, BETA-
- INTESTINE
  - NEONATE, 4121*

GLYCOGEN
- LIVER
  - DIABETES, 4696

GLYCOLYSIS
- ENZYMES
  - SMALL INTESTINE, 4188
- SMALL INTESTINE, 4165*
- STOMACH
  - MUCOSA, 4085

GLYCOPROTEINS
- BLOOD
  - SCHISTOSOMIASIS, 4921*
- INTESTINE
  - CHEMICAL COMPOSITION, 3936
  - IMMUNOFLUORESCENCE, 3936
- STOMACH
  - MUCOSA, 4344
  - NEOPLASMS, MALIGNANT, 4344
  - SECRETION, 3927*
- SYNTHESIS
  - SMALL INTESTINE, 4166*, 4167*

GUANYL CYCLASE
- STIMULATION
  - SECRETIN, 4055*

HAMARTOMA
- BILE DUCT, 4830

HEALING
- DUODENUM
  - ULCER, 4381
- SMALL INTESTINE
  - ANASTOMOSIS, 4450
- STOMACH
  - ULCER, 4346, 4398

HEARTBURN
- ETIOLOGY
  - DIETARY FACTORS, 4295*

HEMANGIOMA
- LIVER
  - ANGIOGRAPHY, 4682

HEMATOLOGY
- GASTRECTOMY
  - SEQUELAE, 4364*

HEMATOMA
- DUODENUM
  - TRAUMA, 4437
- LARGE INTESTINE
  - ANTICOAGULANTS, 4473
- SMALL INTESTINE
  - ANTICOAGULANTS, 4473

HEMATOPOIESIS
- LIVER

- - - DISEASES ASSOCIATED WITH, 4661*

- HEMOCHROMATOSIS
  - BLOOD
    - ZINC, 4791

- HEMORRHAGE
  - SEE BLEEDING

- HEMOSIDEROSIS
  - PORTACAVAL SHUNT
    - SEQUELAE, 4787

- HEPARIN
  - CHOLEDOCHOLITHIASIS
    - THERAPY, 4797*

- HEPATECTOMY
  - CARBOHYDRATE
    - METABOLISM, 4155
  - DETOXIFICATION, 4139
  - LIVER
    - ENZYMES, 4155
  - WATER
    - METABOLISM, 4149

- HEPATITIS
  - BLOOD
    - ZINC, 4791
  - ETIOLOGY
    - BIOPSY, 4716*
  - IMMUNOLOGY
    - REVIEWS, 4762

- HEPATITIS, CHRONIC
  - ANTIGEN, AUSTRALIA
    - CARRIER STATE, 4756*
    - FAMILIAL FACTORS, 4755*
    - IMMUNOLOGY, 4726*
    - ULTRASTRUCTURE, 4737*
  - CIRRHOSIS
    - ETIOLOGY, 4769*
  - CLOTTING
    - LIVER FUNCTION TESTS, 4757*
  - DRUG TREATMENT
    - CORTICOSTEROIDS, 4758*
    - IMMUNOSUPPRESSION, 4758*
  - ETIOLOGY
    - ANTIHYPERTENSIVE AGENTS, 4754*
    - AUTOIMMUNITY, 4761
    - LAXATIVES, 4754*
  - HEPATITIS, VIRAL
    - SEQUELAE, 4732*
  - IMMUNOLOGY, 4749
  - SPLENECTOMY
    - IMMUNOSUPPRESSION, 4760*

- HEPATITIS, NONVIRAL
  - ANESTHETICS, 4722, 4723
  - ETIOLOGY
    - ANTITHYROID AGENTS, 4715*
  - FAMILIAL FACTORS, 4718
  - RENIN, 4128

- HEPATITIS, SERUM
  - ANTIGEN, AUSTRALIA
    - IMMUNOLOGY, 4726*
    - TRANSMISSION, 4752
  - COMPLICATIONS
    - PANCREATITIS, 4649
  - KIDNEY
    - PERFUSION, 4746
  - PREVENTION
    - VACCINE, 4738*

- HEPATITIS, VIRAL
  - ANTIGEN, AUSTRALIA
    - AGE FACTORS, 4750
    - TECHNIQUES, 4245
    - TRANSMISSION, 4750, 4751
    - ULTRASTRUCTURE, 4737*
  - DIAGNOSIS
    - ANTIGEN, AUSTRALIA, 4258
  - DRUG ADDICTION, 4729*
  - ETIOLOGY
    - CYTOMEGALOVIRUS, 4735*
  - IMMUNOGLOBULINS, 4743
  - IMMUNOLOGY, 4740*, 4749
  - KIDNEY
    - DIALYSIS, 4747
  - KIDNEY TRANSPLANTATION
    - COMPLICATIONS, 4741
  - LIVER
    - MORPHOLOGY, 4729*
  - PREGNANCY
    - SURVIVAL, 4728*
  - REVIEWS, 4748, 4753
  - SEQUELAE
    - HEPATITIS, CHRONIC, 4732*
  - SEROLOGICAL DIAGNOSIS
    - MORPHOLOGY, 4729*
  - THERAPY
    - TRANSFUSION, 4734*
  - TRANSMISSION, 4725*, 4727*

- HERNIA
  - SMALL INTESTINE, 4448
    - OBSTRUCTION, 4472
    - STRANGULATION, 4461
  - SURGERY
    - SEQUELAE, 4462

- HERNIA, HIATUS
  - ANTACIDS, 4304
  - BILE
    - VOMITING, 4299
  - CHOLELITHIASIS
    - DIVERTICULUM, 4858
  - DISEASES ASSOCIATED WITH
    - MUSCULOSKELETAL SYSTEM, 4321
  - ESOPHAGUS
    - PRESSURE STUDIES, 4324
  - SURGERY, 4331
    - TECHNIQUES, 4312

- HETEROTOPIA
  - PANCREAS
    - BILE DUCT, 4606

- HIRSCHSPRUNGS DISEASE
  - ANUS
    - PRESSURE STUDIES, 4279
  - DIAGNOSIS
    - PRESSURE STUDIES, 4563
  - RECTUM
    - PRESSURE STUDIES, 4279
  - SURGERY
    - TECHNIQUES, 4540

- HISTAMINE
  - ACID SECRETION
    - STOMACH, 4072*
  - ENDOTOXIN
    - SHOCK, 4844*
  - MESENTERY
    - CIRCULATION, 3940
  - PANCREATITIS, 4642
  - SECRETION
    - STOMACH, 4076
  - STOMACH
    - ACID SECRETION, 4082

- HISTOLOGY
  - SMALL INTESTINE
    - DIARRHEA, 4431

- HODGKINS DISEASE
  - LIVER
    - SCANNING, SCINTILLATION, 4228*

- HOOKWORM
  - EPIDEMIOLOGY, 4918*
    - CHILDREN, 4917*
  - JEJUNUM
    - LACTASE DEFICIENCY, 4945

- HORMONE
  - BLOOD
    - KWASHIORKOR, 4520
  - CIRCADIAN RHYTHM
    - REGIONAL ENTERITIS, 4590*
    - ULCERATIVE COLITIS, 4590*
  - ENDOCRINE SYSTEM
    - LIVER DISEASE, ALCOHOLIC, 4764*
  - GASTROINTESTINAL
    - EVOLUTION, 4209
  - INTRINSIC FACTOR
    - SECRETION, 4077
  - PANCREAS
    - NEOPLASMS, MALIGNANT, 4626
  - SMALL INTESTINE
    - CHROMATOGRAPHY, 4193
    - PEPTIC ULCER, 4420*
  - STOMACH
    - NEOPLASMS, MALIGNANT, 4420*

- HORMONE CONTROL
  - BILIARY TRACT
    - MOTILITY, 4024*
  - BILIRUBIN
    - METABOLISM, 4142
  - GASTRIN
    - SECRETION, 4852*
    - ZOLLINGER-ELLISON SYNDROME, 4854*
  - ION TRANSPORT
    - COLON, 3978*
  - LIVER
    - REGENERATION, 4141
  - PANCREAS
    - SECRETION, 4104, 4109
  - WATER
    - ABSORPTION, 3978*

- HORMONE EFFECTS ON
  - ABSORPTION
    - MACROMOLECULE, 4000
  - ESOPHAGUS
    - PRESSURE STUDIES, 4025*
  - MOTILITY
    - GASTROINTESTINAL, 4023*
  - WATER
    - ABSORPTION, 3986*

- HYALIN
  - LIVER
    - CHOLESTASIS, 4664*
    - CIRRHOSIS, 4664*

- HYDROCARBONS
  - STOMACH
    - RADIOLOGY, 4289

- HYDROCARBONS, HALOGENATED
  - LIVER INJURY, 4713*

- HYPERBILIRUBINEMIA
  - NEONATE
    - DIABETES, 4709
  - PHOTOTHERAPY
    - BILIRUBIN, 4701*

- HYPERCHLORHYDRIA
  - SEE ALSO ACID SECRETION

- HYPERPLASIA
  - PANCREAS
    - PENTAGASTRIN, 4092*

- HYPERTROPHY
  - LIVER
    - ADAPTATION, 4678

- HYPOCHLORHYDRIA
  - SEE ALSO ACID SECRETION
  - VITAMIN B12
    - ABSORPTION, 4366*

- HYPOGLYCEMIA
  - DRUG TREATMENT, 4902
  - ETIOLOGY, 4902
  - STOMACH
    - MOTILITY, 4837*
  - ZOLLINGER-ELLISON SYNDROME, 4837*

- HYPOXIA
  - LIVER
    - FIBROSIS, 4681

- ICTERUS
  - SEE JAUNDICE

- ILEITIS, ACUTE
  - SEQUELAE, 4478

- ILEOSTOMY
  - PANCREAS
    - ENZYMES, 4438
  - TECHNIQUES, 4438
    - ULCERATIVE COLITIS, 4599

- ILEUM
  - SEE ALSO SMALL INTESTINE
  - ACETYLCHOLINE
    - NERVOUS CONTROL, 4173
  - ANOMALY, CONGENITAL
    - OBSTRUCTION, 4453
  - ELECTROPHYSIOLOGY, 4034

- INTUSSUSCEPTION
  - ISCHEMIA, 4460
- MOTILITY
  - ACIDITY, 4052
  - CATECHOLAMINES, 4052
  - ELECTROLYTE, 4052
  - VITAMIN C, 4039
- NEOPLASMS, MALIGNANT
  - AGE FACTORS, 4470
- STENOSIS
  - POTASSIUM, 4877
- SURGERY
  - BILE ACIDS, 4421*, 4423*
  - SEQUELAE, 4445
- TRANSPLANTATION
  - KINETICS, CELL, 4467
  - MORPHOLOGY, 4467
  - NEOPLASMS, MALIGNANT, 4440

ILEUS
- CHILDREN
  - THERAPY, 4454
- ETIOLOGY
  - ANTIDIARRHEALS, 4433
- GALLSTONE, 4435
- PANCREAS
  - AMYLASE, 4912
  - MORPHOLOGY, 4912
- SALIVARY GLANDS
  - AMYLASE, 4912
  - MORPHOLOGY, 4912

IMMUNOFLUORESCENCE
- GLYCOPROTEINS
  - INTESTINE, 3936
- STOMACH
  - GASTRONE, 3924*

IMMUNOGLOBULINS
- APPENDIX
  - ULTRASTRUCTURE, 3933*
- COLOSTRUM
  - ABSORPTION, 3931*
  - CHEMICAL COMPOSITION, 3931*
- GASTRONE
  - ANTIBODIES, 4062*
- HEPATITIS, VIRAL, 4743
- METABOLISM
  - CORTICOSTEROIDS, 4759*
  - LIVER DISEASE, 4759*
- SCHISTOSOMIASIS
  - IMMUNOLOGY, 4920*
  - LIVER, 4920*

IMMUNOLOGY
- AMEBIASIS
  - CHILDREN, 4942
  - DIAGNOSIS, 4267
  - EPIDEMIOLOGY, 4919*
- ANTIGEN, AUSTRALIA
  - HEPATITIS, CHRONIC, 4726*
  - HEPATITIS, SERUM, 4726*
- CELIAC DISEASE, 4496*, 4512
- CIRRHOSIS
  - AGE FACTORS, 4771*, 4772*
  - FAMILIAL FACTORS, 4770*
  - GENETIC FACTORS, 4772*
  - REVIEWS, 4762
- COLON
  - NEOPLASMS, MALIGNANT, 4851*
- CROHNS DISEASE, 4512
- DERMATITIS HERPETIFORMIS, 4512
- DYSENTERY
  - SHIGELLOSIS, 4865
- GASTROINTESTINAL
  - NEOPLASMS, MALIGNANT, 4528*, 4547
- HEPATITIS
  - REVIEWS, 4762
- HEPATITIS, CHRONIC, 4749
- HEPATITIS, VIRAL, 4740*, 4749
- LARGE INTESTINE
  - NEOPLASMS, MALIGNANT, 4541, 4547
- LIVER
  - BIOPSY, 4695
  - COMA, 4773*
  - NEOPLASMS, MALIGNANT, 4749
- PANCREAS
  - NEOPLASMS, MALIGNANT, 4541
- PERITONITIS
  - FOREIGN BODIES, 4885
- REGIONAL ENTERITIS
  - IMMUNOSUPPRESSION, 4477*
- SCHISTOSOMIASIS
  - IMMUNOGLOBULINS, 4920*
- STOMACH
  - NEOPLASMS, MALIGNANT, 4851*

IMMUNOSUPPRESSION
- FECES
  - FATTY ACIDS, 4203*
- GASTRITIS
  - ACID SECRETION, 4332*
  - MORPHOLOGY, 4332*
- HEPATITIS, CHRONIC
  - DRUG TREATMENT, 4758*
  - SPLENECTOMY, 4760*
- REGIONAL ENTERITIS
  - IMMUNOLOGY, 4477*
- ULCERATIVE COLITIS, 4593

INFECTION, BACTERIAL
- AMINO ACIDS
  - ABSORPTION, 4021

INFECTION, FUNGUS
- PERITONITIS, 4876

INJURY
- LIVER
  - ASPARAGINASE, 3957
  - DRUG ADDICTION, 4720
  - DRUG METABOLISM, 4131
  - SEDATIVES, 4131
- STOMACH
  - DRUGS, 3970

INSULIN
- STOMACH
  - SECRETION, 4086

INTESTINE
- SEE ALSO SMALL INTESTINE
- ABSORPTION
  - CATECHOLAMINES, 3999, 4004
  - ENDOCRINE SYSTEM, 3989*
  - GLUCOSE, 3998
  - LECITHIN, 3992*
  - PANTOTHENIC ACID, 3998

    - SHOCK, 3982*
    - TECHNIQUES, 4018
  - AMEBIASIS
    - DRUG TREATMENT, 4935, 4940
  - AMINO ACIDS
    - ION TRANSPORT, 3991*, 4158*, 4159*
  - ANTIBODIES, 3943
  - ANTIGEN, AUSTRALIA
    - INHIBITION, 4727*
  - BACTERIA
    - NEONATE, 4859
  - BILIRUBIN
    - METABOLISM, 4121*
  - CALCIUM
    - ABSORPTION, 3977*, 4013
  - CARBOHYDRATE
    - METABOLISM, 4172
  - CHOLESTEROL
    - METABOLISM, 4058*
  - CHOLINE
    - ABSORPTION, 3981*
  - CIRCULATION
    - DRUG EFFECTS ON, 4202*
    - SEROTONIN, 4201*
  - COPPER
    - ABSORPTION, 3983*
  - CYCLIC ADENOSINE MONOPHOSPHATE
    - ANTIINFLAMMATORY AGENTS, 4195
  - DIETARY FACTORS
    - IRON, 3939
  - DRUG ABSORPTION
    - AGE FACTORS, 4009
    - PHYSICAL FACTORS, 3990*
  - GIARDIASIS
    - DRUG TREATMENT, 4935
  - GLUCOSE
    - ABSORPTION, 3980*, 4014
  - GLUCURONIDASE, BETA-
    - NEONATE, 4121*
  - GLYCOPROTEINS
    - CHEMICAL COMPOSITION, 3936
    - IMMUNOFLUORESCENCE, 3936
  - ION TRANSPORT, 4185
    - VAGOTOMY, 4368*
  - MEMBRANE
    - PROTEIN, 4208
  - MICROORGANISMS
    - DIARRHEA, 4900
    - ENVIRONMENTAL FACTORS, 4186
  - MOTILITY
    - DRUG EFFECTS ON, 4027*
    - FEEDING, 4026*
    - TOXIN, 4048
  - MUCOSA
    - KINETICS, CELL, 3960
  - OBSTRUCTION
    - DIAGNOSIS, 4548
  - PERISTALSIS
    - ELECTROPHYSIOLOGY, 4047
  - SECRETION
    - CHILDREN, 4262
    - TECHNIQUES, 4262
  - TISSUE CULTURE
    - VIRUS, 3942
  - VITAMIN A
    - METABOLISM, 4194
  - ZINC
    - ABSORPTION, 3983*
    - SECRETION, 4192

- INTOLERANCE
  - GALACTOSE
    - PORPHYRIA, 4905
  - PROTEIN
    - DRUG TREATMENT, 4513
  - SUGAR
    - CHILDREN, 4886
  - TRIGLYCERIDE
    - ESOPHAGUS, 4297*

- INTRINSIC FACTOR
  - CHEMICAL COMPOSITION, 4068*
  - SECRETION
    - HORMONE, 4077
    - VITAMIN B12, 4077
  - STOMACH
    - SECRETION, 4077

- INTUBATION
  - NEONATE, 4897
    - TECHNIQUES, 4896
  - PREMATURITY, 4897
    - TECHNIQUES, 4896

- INTUSSUSCEPTION
  - CECUM
    - ISCHEMIA, 4460
  - ETIOLOGY
    - VIRUS, 4539
  - ILEUM
    - ISCHEMIA, 4460
  - LARGE INTESTINE
    - ANGIOGRAPHY, 4414*
  - SMALL INTESTINE
    - ANGIOGRAPHY, 4414*

- ION TRANSPORT
  - AMINO ACIDS
    - DRUG EFFECTS ON, 3995*
    - INTESTINE, 3991*, 4158*, 4159*
  - COLON
    - HORMONE CONTROL, 3978*
    - LAXATIVES, 4022
    - WATER, 4022
  - INTESTINE, 4185
    - VAGOTOMY, 4368*
  - IRON
    - DIETARY FACTORS, 3997
    - SMALL INTESTINE, 3997
  - LIVER
    - AGE FACTORS, 3955
  - RECTUM
    - CROHNS DISEASE, 4530*
    - PROCTITIS, 4580
    - ULCERATIVE COLITIS, 4530*, 4580
  - SMALL INTESTINE
    - ALCOHOL, 3976*
    - PROSTAGLANDIN, 3993*
  - STOMACH, 4006
    - ACIDITY, 4015
    - MUCOSA, 3925*, 3985*
  - TRACE ELEMENT
    - CHOLINE, 4125

- IRON
  - ABSORPTION
    - NEONATE, 3984*
    - PANCREAS DISEASE, 4108
    - SMALL INTESTINE, 3984*

- STOMACH, 3928*
- BINDING
  - MUCINS, 4065*, 4069*
- INTESTINE
  - DIETARY FACTORS, 3939
- ION TRANSPORT
  - DIETARY FACTORS, 3997
  - SMALL INTESTINE, 3997
- METABOLISM
  - STOMACH, 3927*
- STOMACH
  - MUCINS, 4065*

IRRITABLE COLON
- ABDOMEN
  - PAIN, 4577
- PAIN, 4537

ISCHEMIA
- APPENDIX, 4460
- CECUM
  - INTUSSUSCEPTION, 4460
- COLITIS, 4551
  - ATHEROSCLEROSIS, 4573
  - ETIOLOGY, 4533
  - KIDNEY TRANSPLANTATION, 4554
  - ORAL CONTRACEPTIVES, 4573
- DUODENUM
  - ULCER, 4403
- ILEUM
  - INTUSSUSCEPTION, 4460
- LIVER
  - ENZYMES, 3952
  - PERFUSION, 4148
- SMALL INTESTINE
  - ABSORPTION, 4447
  - ANOMALY, CONGENITAL, 4436
  - GLUCOSE, 4447
  - ORAL CONTRACEPTIVES, 4432
- TRANSFUSION
  - ENTEROCOLITIS, 4586

ISOENZYMES
- SERUM
  - JAUNDICE, 4284

JAUNDICE
- CHOLELITHIASIS, 4801*
- ETIOLOGY
  - ANTIINFLAMMATORY AGENTS, 4714*
- GLUCOSE-6-PHOSPHATE DEHYDROGENASE DEFICIENCY, 4710
- LEPTOSPIROSIS, 4899
- LIVER
  - METASTASES, 4669*
- NAPHTHYLISOTHIOCYANATE, ALPHA, 4122*
- ORAL CONTRACEPTIVES, 4711
- PIGMENTATION, 4783
- PREGNANCY, 4711
- PYLORUS
  - STENOSIS, 4353
- SERUM
  - ISOENZYMES, 4284

JAUNDICE, OBSTRUCTIVE
- BILIARY
  - FISTULA, 4451
- DUODENUM
  - FISTULA, 4451
- FIBRINOLYSIS, 4802*
- LIPIDS
  - METABOLISM, 4805*
- LIVER
  - DRUG METABOLISM, 4137
  - NEOPLASMS, MALIGNANT, 4685
- PEPTIC ULCER
  - SEQUELAE, 4369*

JEJUNUM
- SEE ALSO SMALL INTESTINE
- ABSORPTION
  - AMINO ACIDS, 4005
  - DERMATITIS HERPETIFORMIS, 4419*
- CIRCULATION
  - AMINO ACIDS, 4005
- DISACCHARIDASE
  - CELIAC DISEASE, 4497*
  - LACTOSE INTOLERANCE, 4504
- DIVERTICULUM
  - PERFORATION, 4430, 4459
  - RUPTURE, 4444
- ENZYMES
  - CARBOHYDRATE, 4162*
- FOLIC ACID
  - METABOLISM, 4170
- GLUCONEOGENESIS, 4157*
- LACTASE DEFICIENCY
  - HOOKWORM, 4945
- MORPHOLOGY
  - CELIAC DISEASE, 4497*
  - DERMATITIS HERPETIFORMIS, 4419*
- NEOPLASMS, BENIGN
  - BLEEDING, 4466
- NEOPLASMS, MALIGNANT, 4430
  - DRUGS, 4456
- SURGERY
  - TECHNIQUES, 4446
- TRAUMA
  - RUPTURE, 4444

KERNICTERUS
- RISK FACTORS, 4702*

KETOSIS
- ALCOHOL, 4763*, 4768

KIDNEY DISEASE
- STOMACH
  - SURGERY, 4518

KIDNEY TRANSPLANTATION
- BLOOD
  - AMYLASE, 4631*
- COLITIS
  - ISCHEMIA, 4554
- COLON
  - COMPLICATIONS, 4582
- COMPLICATIONS
  - HEPATITIS, VIRAL, 4741
  - PANCREATITIS, 4631*

KINETICS
- CHOLINE
  - ABSORPTION, 3981*

KINETICS, CELL
- DUODENUM
  - VITAMIN D, 4164*

- ILEUM
    - TRANSPLANTATION, 4467
- INTESTINE
    - MUCOSA, 3960
- LARGE INTESTINE
    - MORPHOLOGY, 4189
- LIVER
    - PROTEASE, 3965
- RECTUM
    - ULCERATIVE COLITIS, 4588*
- SMALL INTESTINE, 3974
    - ANTINEOPLASTIC AGENTS, 4199
    - RADIATION, 4199

KININS
- COLON
    - DIVERTICULUM, 4589*
    - ULCERATIVE COLITIS, 4589*
- PANCREATITIS
    - SECRETION, 4630*

KWASHIORKOR
- BLOOD
    - HORMONE, 4520
    - PROTEIN, 4501
- CATECHOLAMINES
    - METABOLISM, 4515
- DISEASES ASSOCIATED WITH
    - ANEMIA, 4502, 4888
- PROTEIN
    - METABOLISM, 4520

LACTASE
- SEE ALSO DISACCHARIDASE

LACTASE DEFICIENCY
- JEJUNUM
    - HOOKWORM, 4945

LACTATE DEHYDROGENASE
- STOMACH
    - NEOPLASMS, MALIGNANT, 4345

LACTIC ACID
- SMALL INTESTINE
    - METABOLISM, 4179

LACTOSE INTOLERANCE
- CHILDREN
    - ADAPTATION, 4499
    - DIETARY FACTORS, 4499
- GENETIC FACTORS, 4494*
- JEJUNUM
    - DISACCHARIDASE, 4504
- PREGNANCY
    - DIET, 4516

LAMBLIASIS
- SEE GIARDIASIS

LAPAROSCOPY
- LIVER DISEASE, 4248

LARGE INTESTINE
- SEE ALSO INTESTINE, APPENDIX, CECUM, COLON, RECTUM, ANUS, SIGMOID
- ABSORPTION
    - WATER, 4050
- BACTERIA
    - AMMONIA, 4191
- CYSTS
    - OXYGEN, 4538
- DIVERTICULUM
    - BLEEDING, 4565
    - EPIDEMIOLOGY, 4570
    - SURGERY, 4565
- ENDOMETRIOSIS
    - SURGERY, 4567
- FISTULA
    - KIDNEY, 4546
    - UROGENITAL SYSTEM, 4545, 4584
- HEMATOMA
    - ANTICOAGULANTS, 4473
- INTUSSUSCEPTION
    - ANGIOGRAPHY, 4414*
- LYMPH
    - CIRCULATION, 4221
- MORPHOLOGY
    - KINETICS, CELL, 4185
- MOTILITY
    - DRUG EFFECTS ON, 4030
    - ELECTRICAL CONTROL, 4030
    - TEMPERATURE, 4038
- MUCINS
    - CHEMICAL COMPOSITION, 3966
- NEOPLASMS, BENIGN, 4559
- NEOPLASMS, MALIGNANT, 4466, 4559
    - IMMUNOLOGY, 4541, 4547
    - PROGNOSIS, 4542
    - SURGERY, 4524*
    - SURVIVAL, 4524*
- OBSTRUCTION
    - ANTICOAGULANTS, 4473
- PERFORATION
    - CROHNS DISEASE, 4483
    - NEOPLASMS, MALIGNANT, 4571
- PNEUMATOSIS
    - ANGIOGRAPHY, 4838*
    - ENDOSCOPY, 4543
- POLYPS
    - EPIDEMIOLOGY, 4570
    - INVASION, 4555
    - SURGERY, 4532
- ULTRASTRUCTURE
    - AMEBIASIS, 4531
- WATER
    - ABSORPTION, 3986*

LAXATIVES
- BREAST FEEDING, 4873
- HEPATITIS, CHRONIC
    - ETIOLOGY, 4754*
- ION TRANSPORT
    - COLON, 4022
- PREGNANCY, 4873

LECITHIN
- INTESTINE
    - ABSORPTION, 3992*
- LIPIDS
    - ABSORPTION, 3992*

LEISHMANIASIS
- TRANSMISSION, 4923, 4936

LEPTOSPIROSIS, 4937
- JAUNDICE, 4899

LEUKEMIA
  ENTEROCOLITIS, NECROTIZING
    DISEASES ASSOCIATED WITH, 4861

LIGNIN
  ABSORPTION
    VITAMIN A, 4012

LIPASE
  BLOOD
    PANCREATITIS, 4654

LIPIDS
  ABSORPTION
    LECITHIN, 3992*
    MALABSORPTION, 4514
    SMALL INTESTINE, 3996*
  BILE
    CHOLELITHIASIS, 4806*, 4808*
    CIRRHOSIS, 4776*
  BILE ACIDS
    SECRETION, 4120*
  CHEMICAL COMPOSITION
    LIVER, 3926*
  GASTROINTESTINAL
    DISEASE, 4846*
  LIVER
    METABOLISM, 4125
    ULTRASTRUCTURE, 3926*
  MALABSORPTION
    BACTERIA, 4213
  METABOLISM
    FATTY LIVER, 4668*
    JAUNDICE, OBSTRUCTIVE, 4805*
    PANCREATITIS, 4629*
  SMALL INTESTINE
    VITAMIN A, 4187
  SYNTHESIS
    SMALL INTESTINE, 4156*

LIPOPROTEINS
  BLOOD
    CHOLESTASIS, 4673*
  FATTY LIVER
    ALCOHOL, 4117*
  LIVER
    ULTRASTRUCTURE, 4216
  METABOLISM
    ALCOHOL, 4766
    PANCREATITIS, 4654

LIVER
  ABSCESS
    AMEBIASIS, 4944
    ANTIBIOTICS, 4724
    ANTIINFLAMMATORY AGENTS, 4724
    FUNGUS, 4724
    SCANNING, SCINTILLATION, 4915*
    SURGERY, 4698
  AMEBIASIS
    DRUG TREATMENT, 4929, 4930
    SURVIVAL, 4930
    THERAPY, 4934
  AMINO ACIDS
    METABOLISM, 4932
  ANGIOGRAPHY, 4293
    PORTAL HYPERTENSION, 4235*
  ATROPHY, 4678
  AUTOLYSIS, 4140
  BIOPSY
    IMMUNOLOGY, 4695
  CAPILLARIASIS
    MORPHOLOGY, 4939
  CARBOHYDRATE
    METABOLISM, 4132
  CELL
    POTASSIUM, 4132
    ULTRASTRUCTURE, 4132
  CHOLESTEROL
    METABOLISM, 4130, 4687
  CIRCULATION
    CATECHOLAMINES, 4143
    RETICULOENDOTHELIAL SYSTEM, 4222
  COMA
    ETIOLOGY, 4773*
    IMMUNOLOGY, 4773*
    SURVIVAL, 4773*
    THERAPY, 4694, 4733*, 4739*, 4792
  COPPER
    DIETARY FACTORS, 4154
  DIAGNOSIS
    ANGIOGRAPHY, 4229*
    SCANNING, SCINTILLATION, 4229*
  DRUG EFFECTS ON
    REVIEWS, 4691
  DRUG METABOLISM
    CHOLERETIC AGENTS, 4134
    ENZYMES, 4151
    JAUNDICE, OBSTRUCTIVE, 4137
    SPECIES DIFFERENCES, 4137
  ENZYMES
    ALCOHOL, 4123*
    DIETARY FACTORS, 4138
    HEPATECTOMY, 4155
    ISCHEMIA, 3952
  FIBROSIS
    CHILDREN, 4681
    FAMILIAL FACTORS, 4671*
    HYPOXIA, 4681
    SCHISTOSOMIASIS, 4921*
  FOLIC ACID
    METABOLISM, 4170
  GAUCHERS DISEASE, 4692
  GLYCOGEN
    DIABETES, 4696
  HEMANGIOMA
    ANGIOGRAPHY, 4682
  HEMATOPOIESIS
    DISEASES ASSOCIATED WITH, 4661*
  HYALIN
    CHOLESTASIS, 4664*
    CIRRHOSIS, 4664*
  HYPERTROPHY
    ADAPTATION, 4678
  INJURY
    ASPARAGINASE, 3957
    DRUG ADDICTION, 4720
    DRUG METABOLISM, 4131
    SEDATIVES, 4131
  ION TRANSPORT
    AGE FACTORS, 3955
  KINETICS, CELL
    PROTEASE, 3965
  LIPIDS
    CHEMICAL COMPOSITION, 3926*
  LYMPHATICS
    LIVER DISEASE, 4690
  METABOLISM

  - ALCOHOL, 4147
  - CATECHOLAMINES, 4143
  - LIPIDS, 4125
  - TRACE ELEMENT, 4125
- METASTASES
  - ANGIOGRAPHY, 4264
  - CALCIFICATION, 4607
  - CHEMOTHERAPY, 4662*, 4669*, 4674*
  - JAUNDICE, 4669*
  - SCANNING, SCINTILLATION, 4226*, 4264
- MICROSOMES
  - DIETARY FACTORS, 4138
  - DRUG METAECLISM, 4127
- MITOCHONDRIA
  - ENZYMES, 3968
  - NUCLEIC ACIDS, 3959
- MORPHOLOGY
  - ANTIGEN, AUSTRALIA, 4730*
  - CIRCADIAN RHYTHM, 3949
  - CIRRHOSIS, 4770*, 4771*
  - CCMA, 4773*
  - HEPATITIS, VIRAL, 4729*
  - PROTEASE, 3965
  - STARVATION, 3949
  - VITAMIN A, 3969
- MUCOPOLYSACCHARIDE
  - ANOMALY, 4684
- NECROSIS
  - NITROSAMINES, 4719
  - RENIN, 4128
  - VIRUS, 4680
- NEOPLASMS
  - SURGERY, 4679
- NEOPLASMS, BENIGN
  - CYTOLOGY, 4225*
  - SCLERODERMA, 4864
  - VIRUS, 4680
- NEOPLASMS, MALIGNANT
  - ANTIGEN, AUSTRALIA, 4755*
  - CHOLESTERCL, 4687
  - DIAGNOSIS, 4663*
  - DISEASES ASSOCIATED WITH, 4693
  - FAMILIAL FACTORS, 4755*
  - FETOPROTEIN, ALPHA, 4241
  - IMMUNOLOGY, 4749
  - JAUNDICE, OBSTRUCTIVE, 4685
  - PERITONEOSCOPY, 4257
  - SURGERY, 4697, 4708
- NUCLEIC ACIDS
  - CIRCADIAN RHYTHM, 4129
  - DRUG EFFECTS ON, 4129
  - SYNTHESIS, 3956
- NUCLEOTIDES
  - PORPHYRIA, 4905
- PANCREAS
  - TRAUMA, 4105
- PERFUSION, 4677
  - ISCHEMIA, 4148
- PHYSICAL PROPERTIES
  - TEMPERATURE, 3954
- PROTEIN
  - DEFICIENCY, 4127
- PYLORUS
  - STENOSIS, 4353
- REGENERATION
  - DIETARY FACTORS, 3962
  - DRUG EFFECTS ON, 4144, 4145
  - HORMONE CCNTROL, 4141
  - NITROSAMINES, 4719
- RETICULCENDOTHELIAL SYSTEM
  - SCANNING, SCINTILLATION, 4283
- RIBOSOMES
  - AMINO ACIDS, 3946
  - ULTRASTRUCTURE, 3950
- SCANNING, SCINTILLATION
  - HODGKINS DISEASE, 4228*
  - LIVER DISEASE, 4281
  - NEOPLASMS, 4236*
  - PSEUDOCYST, 4282
  - TECHNIQUES, 4236*, 4249
- SCHISTOSOMIASIS
  - DRUG TREATMENT, 4931, 4932
  - ENZYMES, 4932
  - IMMUNOGLOBULINS, 4920*
- SECRETION
  - DIETARY FACTORS, 4056*
  - PHYSICAL ACTIVITY, 4057*
  - TRAUMA, 4105
- THROMBOSIS
  - ANGIOGRAPHY, 4683
- TRANSPLANTATION, 4689, 4786
  - COMPLICATIONS, 4666*
  - NEOPLASMS, MALIGNANT, 4666*
  - REJECTION, 4666*
- TRAUMA
  - BLEEDING, 4799*
  - DRAINAGE, 4133
  - SCANNING, SCINTILLATION, 4286
  - SURGERY, 4699, 4717
- ULTRASTRUCTURE
  - AFLATOXIN, 3964
  - ALCOHOL, 3953
  - DIETARY FACTORS, 4216
  - DRUG EFFECTS ON, 3948
  - ETHIONINE, 3945
  - LIPIDS, 3926*
  - LIPOPROTEINS, 4216
  - REYES SYNDROME, 4700
  - STEROID, 3948

LIVER DISEASE
- AMEBIASIS, 4721
- ANGIOGRAPHY, 4292
- BIOPSY, 4248
- CHOLESTEROL
  - METABOLISM, 4789
- CIRCULATION
  - NERVOUS CONTROL, 4779*
- DIAGNOSIS, 4670*
- DISEASES ASSOCIATED WITH
  - CHOLELITHIASIS, 4825
- IMMUNOGLOBULINS
  - METABOLISM, 4759*
- LAFAROSCOPY, 4248
- LIVER
  - LYMPHATICS, 4690
  - SCANNING, SCINTILLATION, 4281
- LIVER FUNCTION TESTS
  - ENZYMES, 4269
- LYMPH
  - CIRCULATION, 4790
- MUSCULOSKELETAL SYSTEM
  - CIRCULATION, 4779*
- NUCLEIC ACIDS
  - SYNTHESIS, 4688
- PERITONEUM
  - DIALYSIS, 4672*

- SEPSIS, 4809
- URINE
  - COPPER, 4670*

LIVER DISEASE, ALCOHOLIC
- CARBOHYDRATE
  - METABOLISM, 4765*
- CLOTTING, 4767
- ENDOCRINE SYSTEM
  - HORMONE, 4764*
- MACROAMYLASE, 4614

LIVER FUNCTION TESTS
- ANTIGEN, AUSTRALIA
  - CARRIER STATE, 4756*
- CIRRHOSIS, 4774*
- ENZYMES
  - LIVER DISEASE, 4269
- HEPATITIS, CHRONIC
  - CLOTTING, 4757*
- MARKER STUDIES
  - TECHNIQUES, 4243
- PORTAL HYPERTENSION, 4235*

LIVER INJURY
- CARBON TETRACHLORIDE
  - ALCOHOL, 4147
  - AMINES, 4136
  - PREVENTION, 4136
- HYDROCARBONS, HALOGENATED, 4713*

LYMPH
- CIRCULATION
  - LARGE INTESTINE, 4221
  - LIVER DISEASE, 4790

LYMPHANGIECTASIA
- SMALL INTESTINE
  - MORPHOLOGY, 4418*
  - PROTEIN-LOSING ENTEROPATHY, 4471
  - ULTRASTRUCTURE, 4418*

LYMPHATICS
- LIVER
  - LIVER DISEASE, 4690
- OBSTRUCTION
  - MALABSORPTION, 4489*
- PANCREAS
  - MORPHOLOGY, 3935
- PERITONITIS
  - BARIUM, 4558
- SMALL INTESTINE
  - PROTEIN, 3996*

LYMPHOCYTE
- TRANSFORMATION
  - CIRRHOSIS, BILIARY, 4778*

LYSOSOMES
- COPPER
  - WILSONS DISEASE, 4665*

MACROAMYLASE
- LIVER DISEASE, ALCOHOLIC, 4614

MACROMOLECULE
- ABSORPTION
  - ENDOCRINE SYSTEM, 3989*
  - HORMONE EFFECTS ON, 4000
  - SMALL INTESTINE, 4000
  - STEROID, 3988*

MAGNESIUM
- ABSORPTION
  - DUODENUM, 4001
- DEFICIENCY
  - PANCREAS DISEASE, 4615
- PANCREAS
  - ENZYMES, 4615

MALABSORPTION
- BACTERIA
  - DISEASES ASSOCIATED WITH, 4500
- BILE ACIDS
  - DIET, 4491*
  - DRUG TREATMENT, 4491*
  - METABOLISM, 4114*
- CROHNS DISEASE
  - SURGERY, 4509
- DIAGNOSIS, 4505, 4514
- DIETARY FACTORS
  - DEFICIENCY, 4488*
- FOLIC ACID
  - CROHNS DISEASE, 4492*
  - DEFICIENCY, 4493*
  - ULCERATIVE COLITIS, 4492*
- GASTRECTOMY
  - SEQUELAE, 4364*
  - SURGERY, 4498*
- GASTROENTERITIS
  - CHILDREN, 4415*
- LIPIDS
  - ABSORPTION, 4514
  - BACTERIA, 4213
- LYMPHATICS
  - OBSTRUCTION, 4489*
- OBESITY
  - SURGERY, 4840*
- PANCREAS
  - SECRETION, 4603*
- REGIONAL ENTERITIS
  - SURGERY, 4475*
- RETICULOENDOTHELIAL SYSTEM
  - DISEASE, 4489*
- SMALL INTESTINE
  - ULTRASTRUCTURE, 4506
- STOMACH
  - SURGERY, 4518
- THERAPY, 4505
- VITAMIN B12
  - BACTERIA, 4522
  - BLIND LOOP SYNDROME, 4522
  - CYSTIC FIBROSIS, 4612
  - GIARDIASIS, 4913*

MALIGNANT
- SEE NEOPLASMS, MALIGNANT

MALNUTRITION
- ANTIGEN, AUSTRALIA
  - EPIDEMIOLOGY, 4744
- CROHNS DISEASE
  - SURGERY, 4509
- DISEASES ASSOCIATED WITH
  - PANCREATITIS, 4517
- PANCREAS
  - ENZYMES, 4517
  - MORPHOLOGY, 4517

- MANOMETRY
  - SEE PRESSURE STUDIES

- MARKER STUDIES
  - BILE DUCT
    - CYSTS, 4288
  - DUBIN-JOHNSON SYNDROME, 4704*
  - GALLBLADDER
    - DIAGNOSIS, 4250
  - GASTRITIS, ATROPHIC
    - MORPHOLOGY, 4379
  - GASTROINTESTINAL TRACT
    - DRUG ABSORPTION, 4010
  - LIVER FUNCTION TESTS
    - TECHNIQUES, 4243
  - MOTILITY
    - SMALL INTESTINE, 4050
  - SMALL INTESTINE
    - CIRCULATION, 4205
  - STOMACH
    - MOTILITY, 4079

- MECKELS DIVERTICULUM
  - COMPLICATIONS
    - RADIOLOGY, 4458
    - VOLVULUS, 4452
  - DIAGNOSIS
    - PERITONEOSCOPY, 4442

- MEDIASTINUM
  - NEOPLASMS, MALIGNANT
    - SCANNING, SCINTILLATION, 4283

- MEGACOLON
  - DIAGNOSIS
    - PRESSURE STUDIES, 4563
  - ETIOLOGY, 4560
  - SURGERY, 4544
    - NERVOUS CONTROL, 4583

- MEMBRANE
  - INTESTINE
    - PROTEIN, 4208

- MENETRIERS DISEASE
  - ALBUMIN
    - METABOLISM, 4358

- MESENTERY
  - CIRCULATION
    - BRADYKININ, 3940
    - HISTAMINE, 3940
  - CYSTS
    - ANGIOGRAPHY, 4874

- METABOLISM
  - ALBUMIN
    - MENETRIERS DISEASE, 4358
    - PROTEIN-LOSING ENTEROPATHY, 4471
  - ALCOHOL
    - BILIRUBIN, 4152
    - CATALASE, 4116*
  - AMINO ACIDS
    - LIVER, 4932
    - SMALL INTESTINE, 4181
  - BILE
    - ANTIBIOTICS, 4146
  - BILE ACIDS, 4120*
    - CHOLELITHIASIS, 4776*, 4808*
    - CIRRHOSIS, 4775*, 4776*
    - DIARRHEA, 4114*
    - MALABSORPTION, 4114*
  - BILIRUBIN
    - HORMONE CONTROL, 4142
    - INTESTINE, 4121*
  - CALCIUM
    - PANCREATITIS, 4639
  - CARBOHYDRATE
    - CIRRHOSIS, 4765*
    - FATTY LIVER, 4765*
    - HEPATECTOMY, 4155
    - INTESTINE, 4172
    - LIVER, 4132
    - LIVER DISEASE, ALCOHOLIC, 4765*
  - CARCINOGENS
    - MICROORGANISMS, 4184
  - CATECHOLAMINES
    - KWASHIORKOR, 4515
  - CHOLESTEROL
    - BACTERIA, 4058*
    - INTESTINE, 4058*
    - LIVER, 4130, 4687
    - LIVER DISEASE, 4789
  - FATTY ACIDS
    - AGE FACTORS, 4176
    - SMALL INTESTINE, 4176
  - FOLIC ACID
    - DIETARY FACTORS, 4170
    - JEJUNUM, 4170
    - LIVER, 4170
    - STEROID, 4170
  - GALACTOSE
    - SMALL INTESTINE, 4183
  - GASTRIN
    - KIDNEY, 4067*, 4075
    - NERVOUS CONTROL, 4080
  - GASTROINTESTINAL
    - CIRCULATION, 4217
  - GLUCAGON
    - EMBRYOLOGY, 4100
  - GLUCOSE
    - SMALL INTESTINE, 4182, 4187, 4188
  - IMMUNOGLOBULINS
    - CORTICOSTEROIDS, 4759*
    - LIVER DISEASE, 4759*
  - IRON
    - STOMACH, 3927*
  - LIPIDS
    - FATTY LIVER, 4668*
    - JAUNDICE, OBSTRUCTIVE, 4805*
    - PANCREATITIS, 4629*
  - LIPOPROTEINS
    - ALCOHOL, 4766
    - PANCREATITIS, 4654
  - LIVER
    - ALCOHOL, 4147
    - CATECHOLAMINES, 4143
    - LIPIDS, 4125
    - TRACE ELEMENT, 4125
  - MUCOPOLYSACCHARIDE
    - COLON, 4576
    - VITAMIN A, 4576
  - PROTEIN
    - DIARRHEA, 4507
    - KWASHIORKOR, 4520
    - SMALL INTESTINE, 4190
  - SMALL INTESTINE
    - LACTIC ACID, 4179

    - OXYGEN, 4179
  - VITAMIN A
    - DIETARY FACTORS, 4194
    - INTESTINE, 4194
  - WATER
    - HEPATECTOMY, 4149

METASTASES
  - DUODENUM
    - NEOPLASMS, MALIGNANT, 4463
  - ESOPHAGUS
    - NEOPLASMS, MALIGNANT, 4308
  - LIVER
    - ANGIOGRAPHY, 4264
    - CALCIFICATION, 4607
    - CHEMOTHERAPY, 4662*, 4669*, 4674*
    - JAUNDICE, 4669*
    - SCANNING, SCINTILLATION, 4226*, 4264

METEOROLOGICAL FACTORS
  - PEPTIC ULCER
    - PERFORATION, 4374

MICROORGANISMS
  - CARCINOGENS
    - METABOLISM, 4184
  - GASTROINTESTINAL
    - ANTIBIOTICS, 4215
  - INTESTINE
    - DIARRHEA, 4900
    - ENVIRONMENTAL FACTORS, 4186

MICROSOMES
  - LIVER
    - DIETARY FACTORS, 4138
    - DRUG METABOLISM, 4127

MITOCHONDRIA
  - LIVER
    - ENZYMES, 3968
    - NUCLEIC ACIDS, 3959
  - STOMACH
    - ENZYMES, 3968

MORTALITY
  - SEE SURVIVAL

MOTILIN
  - CHEMICAL COMPOSITION, 3963

MOTILITY
  - ANUS
    - ELECTROPHYSIOLOGY, 4032
  - BILIARY TRACT
    - ELECTROPHYSIOLOGY, 4031
    - HORMONE CONTROL, 4024*
    - NERVOUS CONTROL, 4024*
  - COLON, 4042
    - CALCIUM, 4035
    - CYCLIC ADENOSINE MONOPHOSPHATE, 4035
    - DIET, 4051
    - PHOSPHODIESTERASE, 4035
  - ESOPHAGUS
    - PRESSURE STUDIES, 4033
  - GALLBLADDER
    - CHOLECYSTOKININ, 4037
    - DRUG EFFECTS ON, 4036
    - NERVOUS CONTROL, 4036
  - GASTROINTESTINAL
    - HORMONE EFFECTS ON, 4023*
    - NERVOUS CONTROL, 4053
  - ILEUM
    - ACIDITY, 4052
    - CATECHOLAMINES, 4052
    - ELECTROLYTE, 4052
    - VITAMIN C, 4039
  - INTESTINE
    - DRUG EFFECTS ON, 4027*
    - FEEDING, 4026*
    - TOXIN, 4048
  - LARGE INTESTINE
    - DRUG EFFECTS ON, 4030
    - ELECTRICAL CONTROL, 4030
    - TEMPERATURE, 4038
  - MARKER STUDIES
    - SMALL INTESTINE, 4050
  - PANCREAS
    - SECRETION, 4112
  - PEPTIC ULCER
    - SURGERY, 4382
  - RECTUM
    - DRUG EFFECTS ON, 4049
  - SMALL INTESTINE
    - ADRENERGIC AGENTS, 4054
    - CIRCULATION, 4028*
    - CYCLIC ADENOSINE MONOPHOSPHATE, 4054
    - PROSTAGLANDIN, 3993*
    - SURGERY, 3944
  - STOMACH, 4044
    - CYCLIC GUANOSINE MONOPHOSPHATE, 4041
    - DRUG EFFECTS ON, 4027*
    - FEEDING, 4026*
    - HYPOGLYCEMIA, 4837*
    - MARKER STUDIES, 4079
    - NEOPLASMS, MALIGNANT, 4347
    - NERVOUS CONTROL, 4041
    - PYLOROPLASTY, 4412
    - TEMPERATURE, 4038
    - VAGOTOMY, 4412

MOUTH
  - CROHNS DISEASE
    - MORPHOLOGY, 4485

MUCINS
  - IRON
    - BINDING, 4065*, 4069*
  - LARGE INTESTINE
    - CHEMICAL COMPOSITION, 3966
  - STOMACH
    - IRON, 4065*

MUCOPOLYSACCHARIDE
  - LIVER
    - ANOMALY, 4684
  - METABOLISM
    - COLON, 4576
    - VITAMIN A, 4576
  - VITAMIN A
    - DEFICIENCY, 4576

MUCOSA
  - COLON
    - ULTRASTRUCTURE, 3930*

- INTESTINE
  - KINETICS, CELL, 3960
- RECTUM
  - TISSUE CULTURE, 3941
- SMALL INTESTINE
  - ENZYMES, 3967
- STOMACH
  - BILE, 3925*
  - ELECTROPHYSIOLOGY, 3925*
  - ENDOCRINE SYSTEM, 3973
  - ENZYMES, 3961
  - GLYCOLYSIS, 4085
  - GLYCOPROTEINS, 4344
  - ION TRANSPORT, 3925*, 3985*
  - POTASSIUM, 4085
  - SURGERY, 4066*
  - ULTRASTRUCTURE, 3934*

MUSCULOSKELETAL SYSTEM
- CIRCULATION
  - LIVER DISEASE, 4779*
- HERNIA, HIATUS
  - DISEASES ASSOCIATED WITH, 4321
- PANCREATITIS
  - DISEASES ASSOCIATED WITH, 4656
- ULCERATIVE COLITIS
  - FAMILIAL FACTORS, 4594

MYCOSIS
- SEE FUNGUS DISEASE

NAPHTHYLISOTHIOCYANATE, ALPHA
- JAUNDICE, 4122*

NECROSIS
- LIVER
  - NITROSAMINES, 4719
  - RENIN, 4128
  - VIRUS, 4680

NEONATE
- SEE ALSO AGE FACTORS, CHILDREN
- BACTERIA
  - ANTIBIOTICS, 4859
- BILIRUBIN
  - TECHNIQUES, 4280
- HYPERBILIRUBINEMIA
  - DIABETES, 4709
- INTESTINE
  - BACTERIA, 4859
  - GLUCURONIDASE, BETA-, 4121*
- INTUBATION, 4897
  - TECHNIQUES, 4896
- IRON
  - ABSORPTION, 3984*
- STOMACH
  - PERFORATION, 4351
- TRANSFUSION
  - ENTEROCOLITIS, 4586

NEOPLASMS
- CIRRHOSIS
  - GALACTOSAMINE, 4793
- LIVER
  - SCANNING, SCINTILLATION, 4236*
  - SURGERY, 4679
- PANCREAS, 4609
- SALIVARY GLANDS
  - REVIEWS, 4871

NEOPLASMS, BENIGN
- SEE ALSO POLYPS
- GALLBLADDER
  - RADIOLOGY, 4833
- JEJUNUM
  - BLEEDING, 4466
- LARGE INTESTINE, 4559
- LIVER
  - CYTOLOGY, 4225*
  - SCLERODERMA, 4864
  - VIRUS, 4680
- PARATHYROID GLAND
  - CHOLELITHIASIS, 4800*
- SALIVARY GLANDS, 4908
  - NUCLEIC ACIDS, 4862
- STOMACH
  - RADIOLOGY, 4340

NEOPLASMS, MALIGNANT
- AMPULLA OF VATER
  - SURGERY, 4427, 4617
- ANTIGEN, AUSTRALIA
  - DISEASES ASSOCIATED WITH, 4745
- ANUS, 4535
  - DISEASES ASSOCIATED WITH, 4536
- APPENDIX, 4550
- BILE DUCT
  - STENOSIS, 4828
  - SURGERY, 4617, 4807*
  - ULCERATIVE COLITIS, 4592, 4807*
- BILIARY TRACT
  - INVASION, 4685
- CECUM, 4469
- CIRCULATION
  - BUDD-CHIARI SYNDROME, 4675
- COLON
  - FAMILIAL FACTORS, 4525*
  - IMMUNOLOGY, 4851*
  - PERFORATION, 4552
- DUODENUM
  - METASTASES, 4463
  - PEPTIC ULCER, 4384
  - SURGERY, 4427
- ESOPHAGUS, 4306
  - CYTOLOGY, 4326, 4327
  - METASTASES, 4308
  - RADIATION, 4301
  - RADIOLOGY, 4300
  - RADIOTHERAPY, 4302, 4317
  - SURGERY, 4301, 4302, 4313
  - SURVIVAL, 4319
- GALLBLADDER
  - DISEASES ASSOCIATED WITH, 4831
- GASTROINTESTINAL
  - BIOPSY, 4275
  - BLEEDING, 4348
  - CHEMOTHERAPY, 4906
  - CYTOLOGY, 4275
  - IMMUNOLOGY, 4528*, 4547
- ILEUM
  - AGE FACTORS, 4470
  - TRANSPLANTATION, 4440
- JEJUNUM, 4430
  - DRUGS, 4456
- LARGE INTESTINE, 4466, 4559
  - IMMUNOLOGY, 4541, 4547
  - PERFORATION, 4571
  - PROGNOSIS, 4542
  - SURGERY, 4524*

        SURVIVAL, 4524*
    LIVER
        ANTIGEN, AUSTRALIA, 4755*
        CHOLESTEROL, 4687
        DIAGNOSIS, 4663*
        DISEASES ASSOCIATED WITH, 4693
        FAMILIAL FACTORS, 4755*
        FETOPROTEIN, ALPHA, 4241
        IMMUNOLOGY, 4749
        JAUNDICE, OBSTRUCTIVE, 4685
        PERITONEOSCOPY, 4257
        SURGERY, 4697, 4708
        TRANSPLANTATION, 4666*
    MEDIASTINUM
        SCANNING, SCINTILLATION, 4283
    PANCREAS, 4607
        ANEMIA, HEMOLYTIC, 4619
        CHILDREN, 4601*
        DIABETES, 4600*
        EPIDEMIOLOGY, 4600*, 4608
        ETIOLOGY, 4608
        HORMONE, 4626
        IMMUNOLOGY, 4541
        RADIOTHERAPY, 4620
        SURGERY, 4605, 4617
    PEPTIC ULCER
        DISEASES ASSOCIATED WITH, 4346
    RECTUM
        DISEASES ASSOCIATED WITH, 4536
        SURGERY, 4572
    SALIVARY GLANDS, 4908
        NUCLEIC ACIDS, 4862
    SMALL INTESTINE
        REGIONAL ENTERITIS, 4476*
    STEATORRHEA
        DISEASES ASSOCIATED WITH, 4456
    STOMACH
        ACHLORHYDRIA, 4349
        CYTOLOGY, 4336
        ENDOSCOPY, 4285, 4336
        ENZYMES, 4361
        EPIDEMIOLOGY, 4350, 4608
        ETIOLOGY, 4608
        FOOD ADDITIVES, 4342
        GLYCOPROTEINS, 4344
        HORMONE, 4420*
        IMMUNOLOGY, 4851*
        LACTATE DEHYDROGENASE, 4345
        MOTILITY, 4347
        RADIOLOGY, 4340
        SURGERY, 4356
        VARICES, 4335
    THYROID
        DIARRHEA, 4892
        GASTRIN, 4852*
    ULCERATIVE COLITIS
        DISEASES ASSOCIATED WITH, 4592

NERVOUS CONTROL
    ANORECTUM
        SURGERY, 4583
    BILIARY TRACT
        MOTILITY, 4024*
    CIRCULATION
        LIVER DISEASE, 4779*
    GASTRIN
        METABOLISM, 4080
    ILEUM
        ACETYLCHOLINE, 4173
    MEGACOLON
        SURGERY, 4583
    MOTILITY
        GALLBLADDER, 4036
        GASTROINTESTINAL, 4053
        STOMACH, 4041
    PANCREAS
        SECRETION, 4095*, 4104, 4109, 4111
    SALIVA
        SECRETION, 4060, 4061
    SMALL INTESTINE
        PANCREOZYMIN, 4180
        SECRETIN, 4180
    STOMACH, 3972
        SECRETION, 4080

NERVOUS SYSTEM
    BLOOD
        BILIRUBIN, 4707
    GASTROINTESTINAL TRACT
        MORPHOLOGY, 4218
    STOMACH
        ULCER, 4408
    ULTRASTRUCTURE
        WILSONS DISEASE, 4686

NITROSAMINES
    CIRRHOSIS
        CIRCULATION, 4785
    LIVER
        NECROSIS, 4719
        REGENERATION, 4719

NUCLEIC ACIDS
    LIVER
        CIRCADIAN RHYTHM, 4129
        DRUG EFFECTS ON, 4129
        MITOCHONDRIA, 3959
    SALIVARY GLANDS
        NEOPLASMS, BENIGN, 4862
        NEOPLASMS, MALIGNANT, 4862
    SYNTHESIS
        LIVER, 3956
        LIVER DISEASE, 4688

NUCLEOTIDES
    LIVER
        PORPHYRIA, 4905

OBESITY
    SURGERY
        COMPLICATIONS, 4840*
        ELECTROPHYSIOLOGY, 4575
        MALABSORPTION, 4840*

OBSTRUCTION
    ILEUM
        ANOMALY, CONGENITAL, 4453
    INTESTINE
        DIAGNOSIS, 4548
    LARGE INTESTINE
        ANTICOAGULANTS, 4473
    LYMPHATICS
        MALABSORPTION, 4489*
    SMALL INTESTINE
        ANTICOAGULANTS, 4473
        HERNIA, 4472
        THERAPY, 4441

- OBSTRUCTIVE JAUNDICE
  - SEE JAUNDICE, OBSTRUCTIVE

- OMENTUM
  - CARCINOGENS, 4212

- OMPHALOCELES
  - STOMACH
    - ANOMALY, CONGENITAL, 4860

- ORAL CONTRACEPTIVES
  - COLITIS
    - ISCHEMIA, 4573
  - DUBIN-JOHNSON SYNDROME, 4703*
  - JAUNDICE, 4711
  - SMALL INTESTINE
    - ISCHEMIA, 4432

- OXYGEN
  - LARGE INTESTINE
    - CYSTS, 4538
  - SMALL INTESTINE
    - METABOLISM, 4179

- PAIN
  - ABDOMEN
    - IRRITABLE COLON, 4577
  - IRRITABLE COLON, 4537

- PANCREAS
  - ABSCESS
    - DRAINAGE, 4634
  - ABSORPTION, 4095*
    - DRUG EFFECTS ON, 4098*
  - AMYLASE
    - ILEUS, 4912
    - PERITONITIS, 4912
  - ANGIOGRAPHY, 4293
  - BIOPSY, 4254
  - CELLS
    - EMBRYOLOGY, 3937
    - TISSUE CULTURE, 3937
  - CIRCULATION
    - MORPHOLOGY, 3951
  - ENZYMES
    - ILEOSTOMY, 4438
    - MAGNESIUM, 4615
    - MALNUTRITION, 4517
    - PANCREAS DISEASE, 4641
    - PANCREATITIS, 4641
    - SECRETION, 4603*
  - HETEROTOPIA
    - BILE DUCT, 4606
  - HYPERPLASIA
    - PENTAGASTRIN, 4092*
  - LYMPHATICS
    - MORPHOLOGY, 3935
  - MORPHOLOGY
    - ANTINEOPLASTIC AGENTS, 4102
    - ILEUS, 4912
    - MALNUTRITION, 4517
    - PERITONITIS, 4912
    - TRACE ELEMENT, 4610
  - NEOPLASMS, 4609
  - NEOPLASMS, MALIGNANT, 4607
    - ANEMIA, HEMOLYTIC, 4619
    - CHILDREN, 4601*
    - DIABETES, 4600*
    - EPIDEMIOLOGY, 4600*, 4608
    - ETIOLOGY, 4608
    - HORMONE, 4626
    - IMMUNOLOGY, 4541
    - RADIOTHERAPY, 4620
    - SURGERY, 4605, 4617
  - PROTEASE
    - DIET, 4093*
  - PROTEIN
    - DRUG EFFECTS ON, 4098*
  - PSEUDOCYST
    - ANOMALY, CONGENITAL, 4624
    - COMPLICATIONS, 4648
    - DIAGNOSIS, 4282
    - RUPTURE, 4637
    - SURGERY, 4616, 4622
  - SCANNING, SCINTILLATION
    - PANCREAS FUNCTION TESTS, 4234*
  - SECRETION
    - ALCOHOL, 4111
    - ANTINEOPLASTIC AGENTS, 4102
    - CATECHOLAMINES, 4101
    - CHOLECYSTOKININ, 4094*, 4096*
    - DIETARY FACTORS, 4056*
    - DIGESTION, 4106
    - DRUG EFFECTS ON, 4098*
    - ELECTROLYTE, 4107
    - ENZYMES, 4106
    - FEEDING, 4112
    - GLUCOSE, 4091*
    - HORMONE CONTROL, 4104, 4109
    - MALABSORPTION, 4603*
    - MOTILITY, 4112
    - NERVOUS CONTROL, 4095*, 4104, 4109, 4111
    - PANCREAS FUNCTION TESTS, 4234*
    - PANCREOZYMIN, 4094*, 4113
    - PENTAGASTRIN, 4096*
    - PHYSICAL ACTIVITY, 4057*
    - PROTEASE, 4103
    - PROTEIN, 4097*
    - REVIEWS, 4108, 4109
    - SECRETIN, 4091*, 4113
    - THYROID, 4090*
    - TRANSPLANTATION, 4110
    - ZINC, 4099*
  - TRACE ELEMENT
    - DEFICIENCY, 3932*
  - TRANSPLANTATION, 4426
    - REVIEWS, 4625, 4627
  - TRAUMA
    - COMPLICATIONS, 4621
    - LIVER, 4105
    - SURGERY, 4613, 4621

- PANCREAS DISEASE
  - CHILDREN, 4611
  - IRON
    - ABSORPTION, 4108
  - MAGNESIUM
    - DEFICIENCY, 4615
  - PANCREAS
    - ENZYMES, 4641
  - VITAMIN B12
    - ABSORPTION, 4108

- PANCREAS FUNCTION TESTS
  - PANCREAS
    - SCANNING, SCINTILLATION, 4234*
    - SECRETION, 4234*

- PANCREATIC DUCT
  - ENDOSCOPY, 4252, 4259, 4380
  - RADIOLOGY, 4231*
  - REFLUX
    - ALCOHOL, 4635
  - RUPTURE
    - PANCREATITIS, CHRONIC, 4658

- PANCREATITIS
  - BILIARY TRACT
    - SURGERY, 4652
  - BLOOD
    - LIPASE, 4654
  - CALCIUM
    - METABOLISM, 4639
  - COMPLICATIONS
    - ANTIBIOTICS, 4633*
    - BACTERIA, 4633*
    - CIRCULATION, 4630*
    - SURGERY, 4660
  - DIAGNOSIS, 4644
  - DISEASES ASSOCIATED WITH
    - MUSCULOSKELETAL SYSTEM, 4656
  - ETIOLOGY
    - ALCOHOL, 4635, 4636, 4638
    - CHOLELITHIASIS, 4636
  - FAMILIAL FACTORS
    - SURGERY, 4651
  - HEPATITIS, SERUM
    - COMPLICATIONS, 4649
  - HISTAMINE, 4642
  - KIDNEY TRANSPLANTATION
    - COMPLICATIONS, 4631*
  - LIPIDS
    - METABOLISM, 4629*
  - LIPOPROTEINS
    - METABOLISM, 4654
  - MALNUTRITION
    - DISEASES ASSOCIATED WITH, 4517
  - PANCREAS
    - ENZYMES, 4641
  - PROTEASE
    - INHIBITION, 4646
  - RADIOLOGY, 4253
  - SECRETION
    - KININS, 4630*
  - SIMULATION
    - TRYPSIN, 4657
    - ULTRASTRUCTURE, 4655
  - SURGERY, 4660
  - VASOPRESSIN
    - CIRCULATION, 4632*

- PANCREATITIS, CHRONIC, 4659
  - CALCIFICATION
    - ULTRASTRUCTURE, 4650
  - COMPLICATIONS
    - ASCITES, 4658
  - DIAGNOSIS, 4643
  - DIET, 4640
  - FAMILIAL FACTORS
    - SURGERY, 4645
  - GASTRITIS
    - BACTERIA, 4653
  - PANCREATIC DUCT
    - RUPTURE, 4658
  - RECURRENCE
    - SURGERY, 4628*
  - SCANNING, SCINTILLATION, 4623
  - SURGERY, 4647
  - VITAMIN
    - DEFICIENCY, 4640

- PANCREOZYMIN
  - GALLBLADDER
    - SECRETION, 4094*
  - PANCREAS
    - SECRETION, 4094*, 4113
  - SMALL INTESTINE
    - NERVOUS CONTROL, 4180

- PANTOTHENIC ACID
  - INTESTINE
    - ABSORPTION, 3998

- PARASITES AND PARASITIC DISEASE
  - DRUG TREATMENT, 4928
  - EPIDEMIOLOGY, 4924
    - AGE FACTORS, 4927
    - CHILDREN, 4927, 4941

- PARATHYROID GLAND
  - NEOPLASMS, BENIGN
    - CHOLELITHIASIS, 4800*
  - SECRETION
    - CHOLELITHIASIS, 4800*

- PARATYPHOID FEVER
  - SEE SALMONELLOSIS

- PELIOSIS HEPATIS
  - ETIOLOGY
    - STEROID, 4712*

- PENTAGASTRIN
  - BILE
    - SECRETION, 4153
  - PANCREAS
    - HYPERPLASIA, 4092*
    - SECRETION, 4096*
  - SECRETION
    - STOMACH, 4071*

- PEPSIN
  - STOMACH
    - CHEMICAL COMPOSITION, 4059

- PEPSIN SECRETION
  - DUODENUM
    - ULCER, 4405
  - STOMACH
    - SECRETIN, 4372*
    - VAGOTOMY, 4372*

- PEPSINOGEN
  - STOMACH
    - CHEMICAL COMPOSITION, 4059

- PEPTIC ULCER
  - SEE ALSO STOMACH ULCER, DUODENUM ULCER
  - ACID SECRETION
    - DIETARY FACTORS, 4383
    - ETHNIC FACTORS, 4386
    - SECRETIN, 4409
  - BLEEDING
    - ANGIOGRAPHY, 4363*
    - RECURRENCE, 4371*
    - SURGERY, 4371*

    SURVIVAL, 4371*
    VASOPRESSIN, 4363*
  CIRCULATION
    DRUG EFFECTS ON, 4404
  DISEASES ASSOCIATED WITH
    ENDOCRINE SYSTEM, 4395
    NEOPLASMS, MALIGNANT, 4346
  DRUG TREATMENT, 4378
    AMINO ACIDS, 4388
  DUODENUM
    NEOPLASMS, MALIGNANT, 4384
  ESOPHAGITIS, REFLUX
    DISEASES ASSOCIATED WITH, 4320
  PERFORATION
    METEOROLOGICAL FACTORS, 4374
  PORTACAVAL SHUNT
    SEQUELAE, 4787
  PREVENTION
    DRUG TREATMENT, 4411
  RECURRENCE
    PERFORATION, 4392
    SURGERY, 4392, 4406
  SEQUELAE
    CIRCULATION, 4369*
    JAUNDICE, OBSTRUCTIVE, 4369*
  SMALL INTESTINE
    HORMONE, 4420*
  STOMACH
    ACID SECRETION, 4367*
    ENDOSCOPY, 4399
    ENZYMES, 4361
  STRESS
    BILE, 4373*
    PREVENTION, 4373*, 4375
    SIMULATION, 4373*, 4375
    SURGERY, 4362*
    SURVIVAL, 4362*
  SURGERY
    CHILDREN, 4396
    COMPLICATIONS, 4410, 4434
    DRAINAGE, 4365*
    GASTRIN, 4397
    MOTILITY, 4382
    RADIOLOGY, 4334
    SALMONELLOSIS, 4867
    SEQUELAE, 4334, 4365*, 4380
    SURVIVAL, 4410
    TECHNIQUES, 4393, 4394
  VAGOTOMY
    ACID SECRETION, 4402
    PRESSURE STUDIES, 4407
    TECHNIQUES, 4402

PERFORATION
  APPENDICITIS
    REGIONAL ENTERITIS, 4527*
  COLON
    NEOPLASMS, MALIGNANT, 4552
  DUODENUM
    ENDOSCOPY, 4439
    ULCER, 4370*, 4459
  ESOPHAGUS, 4315
  JEJUNUM
    DIVERTICULUM, 4430, 4459
  LARGE INTESTINE
    CROHNS DISEASE, 4483
    NEOPLASMS, MALIGNANT, 4571
  PEPTIC ULCER
    METEOROLOGICAL FACTORS, 4374
    RECURRENCE, 4392
  SIGMOID, 4534
  SMALL INTESTINE
    CROHNS DISEASE, 4483
    PNEUMATOSIS, 4459
  STOMACH
    NEONATE, 4351
    SURGERY, 4351
    SURVIVAL, 4351

PERFUSION
  ANTIBIOTICS
    PERITONITIS, 4839*
  COLON
    BACTERIA, 4529*
  KIDNEY
    HEPATITIS, SERUM, 4746
  LIVER, 4677
    ISCHEMIA, 4148
  PERITONEUM
    PERITONITIS, 4227*
  TECHNIQUES
    GASTROINTESTINAL TRACT, 4224

PERISTALSIS
  ELECTROPHYSIOLOGY, 4045
  INTESTINE
    ELECTROPHYSIOLOGY, 4047
  PRESSURE STUDIES
    DUODENUM, 4046
    STOMACH, 4046

PERITONEOSCOPY
  LIVER
    NEOPLASMS, MALIGNANT, 4257
  MECKELS DIVERTICULUM
    DIAGNOSIS, 4442

PERITONEUM
  DIALYSIS
    LIVER DISEASE, 4672*
  FOREIGN BODIES
    ADHESIONS, 4889
  PERFUSION
    PERITONITIS, 4227*

PERITONITIS, 4894
  ANTIBACTERIALS, 4893
  ANTIBIOTICS
    PERFUSION, 4839*
  BARIUM
    LYMPHATICS, 4558
  FOREIGN BODIES, 4883, 4907
    ANTIINFLAMMATORY AGENTS, 4911
    IMMUNOLOGY, 4885
  INFECTION, FUNGUS, 4876
  PANCREAS
    AMYLASE, 4912
    MORPHOLOGY, 4912
  PERITONEUM
    PERFUSION, 4227*
  SALIVARY GLANDS
    AMYLASE, 4912
    MORPHOLOGY, 4912

PHENOBARBITAL
  DRUG METABOLISM
    SMALL INTESTINE, 4196

- PHOSPHATASE, ALKALINE
  - SMALL INTESTINE
    - CHOLECYSTOKININ, 4163*
    - SECRETIN, 4163*
- PHOSPHODIESTERASE
  - MOTILITY
    - COLON, 4035
- PHOTOTHERAPY
  - HYPERBILIRUBINEMIA
    - BILIRUBIN, 4701*
- PHYSICAL ACTIVITY
  - LIVER
    - SECRETION, 4057*
  - PANCREAS
    - SECRETION, 4057*
  - STOMACH
    - SECRETION, 4057*
- PHYSICAL FACTORS
  - INTESTINE
    - DRUG ABSORPTION, 3990*
- PIGMENTATION
  - FECES
    - FOOD ADDITIVES, 4903
  - JAUNDICE, 4783
- PLASMA
  - SEE BLOOD
- PNEUMATOSIS
  - LARGE INTESTINE
    - ANGIOGRAPHY, 4838*
    - ENDOSCOPY, 4543
  - SMALL INTESTINE
    - PERFORATION, 4459
- POISONING
  - STOMACH
    - RADIOLOGY, 4289
- POLYPS
  - SEE ALSO NEOPLASMS, BENIGN
  - COLITIS, GRANULOMATOUS
    - COMPLICATIONS, 4523*
  - COLON
    - ENDOSCOPY, 4549
    - SURGERY, 4549
    - ULTRASTRUCTURE, 3930*
  - ESOPHAGUS
    - SURGERY, 4305, 4343
  - LARGE INTESTINE
    - EPIDEMIOLOGY, 4570
    - INVASION, 4555
    - SURGERY, 4532
  - STOMACH
    - SURGERY, 4343, 4355
- PORPHYRIA
  - GALACTOSE
    - INTOLERANCE, 4905
  - LIVER
    - NUCLEOTIDES, 4905
- PORTACAVAL SHUNT
  - SEQUELAE
    - COMA, 4787
    - DIABETES, 4787
    - HEMOSIDEROSIS, 4787
    - PEPTIC ULCER, 4787
  - VARICES
    - SURVIVAL, 4782*
- PORTAL HYPERTENSION
  - DISEASES ASSOCIATED WITH, 4661*
  - LIVER
    - ANGIOGRAPHY, 4235*
  - LIVER FUNCTION TESTS, 4235*
- POTASSIUM
  - ILEUM
    - STENOSIS, 4877
  - LIVER
    - CELL, 4132
  - PYLORUS
    - STENOSIS, 4877
  - STOMACH
    - MUCOSA, 4085
- PREGNANCY
  - DUBIN-JOHNSON SYNDROME, 4703*
  - HEPATITIS, VIRAL
    - SURVIVAL, 4728*
  - JAUNDICE, 4711
  - LACTOSE INTOLERANCE
    - DIET, 4516
  - LAXATIVES, 4873
- PREMATURITY
  - ENTEROCOLITIS, NECROTIZING
    - SALMONELLOSIS, 4843*
  - INTUBATION, 4897
    - TECHNIQUES, 4896
- PRESSURE STUDIES
  - ANUS
    - HIRSCHSPRUNGS DISEASE, 4279
  - COLON
    - DRUG EFFECTS ON, 4029
  - ESOPHAGITIS, REFLUX
    - DRUG EFFECTS ON, 4328
  - ESOPHAGUS, 4316
    - COLLAGEN DISEASES, 4294*
    - DIETARY FACTORS, 4297*
    - HERNIA, HIATUS, 4324
    - HORMONE EFFECTS ON, 4025*
    - SPHINCTER, 4040
    - VAGOTOMY, 4324, 4407
  - HIRSCHSPRUNGS DISEASE
    - DIAGNOSIS, 4563
  - MEGACOLON
    - DIAGNOSIS, 4563
  - MOTILITY
    - ESOPHAGUS, 4033
  - PEPTIC ULCER
    - VAGOTOMY, 4407
  - PERISTALSIS
    - DUODENUM, 4046
    - STOMACH, 4046
  - RECTUM
    - HIRSCHSPRUNGS DISEASE, 4279
- PREVENTION
  - ENTERITIS
    - VACCINE, 4878

  HEPATITIS, SERUM
    VACCINE, 4738*
  LIVER INJURY
    CARBON TETRACHLORIDE, 4136
  PEPTIC ULCER
    DRUG TREATMENT, 4411
    STRESS, 4373*, 4375

PROCTITIS
  RECTUM
    ION TRANSPORT, 4580

PROGNOSIS
  LARGE INTESTINE
    NEOPLASMS, MALIGNANT, 4542
  ULCERATIVE COLITIS
    CHILDREN, 4598
  ZOLLINGER-ELLISON SYNDROME
    GASTRIN, 4841*

PROLAPSE
  RECTUM
    AMEBIASIS, 4943

PROSTAGLANDIN
  GASTROINTESTINAL TRACT, 4895
  SMALL INTESTINE
    ION TRANSPORT, 3993*
    MOTILITY, 3993*

PROTEASE
  INHIBITION
    PANCREATITIS, 4646
  LIVER
    KINETICS, CELL, 3965
    MORPHOLOGY, 3965
  PANCREAS
    DIET, 4093*
    SECRETION, 4103
  SYNTHESIS
    ZYMOGENS, 4103

PROTEIN
  BLOOD
    CIRRHOSIS, BILIARY, 4780*
    KWASHIORKOR, 4501
  DEFICIENCY
    LIVER, 4127
  INTESTINE
    MEMBRANE, 4208
  INTOLERANCE
    DRUG TREATMENT, 4513
  METABOLISM
    DIARRHEA, 4507
    KWASHIORKOR, 4520
    SMALL INTESTINE, 4190
  PANCREAS
    DRUG EFFECTS ON, 4098*
    SECRETION, 4097*
  SALIVA
    GENETIC FACTORS, 4214
  SMALL INTESTINE
    LYMPHATICS, 3996*
  SYNTHESIS
    CHOLERA, 4178
    SMALL INTESTINE, 4178

PROTEIN-LOSING ENTEROPATHY
  ALBUMIN
    METABOLISM, 4471
  SMALL INTESTINE
    LYMPHANGIECTASIA, 4471

PSEUDOCYST
  ARTERY
    RUPTURE, 4648
  LIVER
    SCANNING, SCINTILLATION, 4282
  PANCREAS
    ANOMALY, CONGENITAL, 4624
    COMPLICATIONS, 4648
    DIAGNOSIS, 4282
    RUPTURE, 4637
    SURGERY, 4616, 4622
  STOMACH
    ANOMALY, CONGENITAL, 4624

PYLOROPLASTY
  ALCOHOL
    ABSORPTION, 4357
  STOMACH
    MOTILITY, 4412

PYLORUS
  SEE ALSO STOMACH
  STENOSIS
    ANOMALY, CONGENITAL, 4341
    JAUNDICE, 4353
    LIVER, 4353
    POTASSIUM, 4877
    RADIOLOGY, 4360
    THERAPY, 4360

RADIATION
  ESOPHAGUS
    NEOPLASMS, MALIGNANT, 4301
  SMALL INTESTINE
    KINETICS, CELL, 4199
    MORPHOLOGY, 3947
    STENOSIS, 4429

RADIOIMMUNOASSAY
  ANTIGEN, AUSTRALIA
    CIRRHOSIS, BILIARY, 4781*
  SERUM
    GASTRIN, 4246

RADIOLOGY
  ABDOMEN, ACUTE, 4265
  BILE DUCT, 4231*
    CYSTS, 4815
  BILIARY TRACT
    FISTULA, 4821
  CAPILLARIASIS, 4914*
  COLITIS, 4291
  ESOPHAGUS
    CHEMICAL BURNS, 4296*
    NEOPLASMS, MALIGNANT, 4300
    SPHINCTER, 4040
  GALLBLADDER
    ANOMALY, CONGENITAL, 4820
    CONTRAST MEDIA, 4287
    NEOPLASMS, BENIGN, 4833
  GASTROINTESTINAL
    TUBERCULOSIS, 4842*
  MECKELS DIVERTICULUM
    COMPLICATIONS, 4458
  PANCREATIC DUCT, 4231*

- PANCREATITIS, 4253
- PEPTIC ULCER
  - SURGERY, 4334
- PYLORUS
  - STENOSIS, 4360
- SMALL INTESTINE, 4278
  - ASCARIASIS, 4925
  - CYSTIC FIBROSIS, 4604*
- STOMACH, 4277
  - HYDROCARBONS, 4289
  - NEOPLASMS, BENIGN, 4340
  - NEOPLASMS, MALIGNANT, 4340
  - POISONING, 4289
  - VARICES, 4335
- ULCERATIVE COLITIS, 4244

RADIOTHERAPY
- ESOPHAGUS
  - NEOPLASMS, MALIGNANT, 4302, 4317
- PANCREAS
  - NEOPLASMS, MALIGNANT, 4620

RECTUM
- SEE ALSO LARGE INTESTINE
- BLEEDING
  - CHILDREN, 4578
  - ETIOLOGY, 4578
- ION TRANSPORT
  - CROHNS DISEASE, 4530*
  - PROCTITIS, 4580
  - ULCERATIVE COLITIS, 4530*, 4580
- KINETICS, CELL
  - ULCERATIVE COLITIS, 4588*
- MOTILITY
  - DRUG EFFECTS ON, 4049
- MUCOSA
  - TISSUE CULTURE, 3941
- NEOPLASMS, MALIGNANT
  - DISEASES ASSOCIATED WITH, 4536
  - SURGERY, 4572
- PRESSURE STUDIES
  - HIRSCHSPRUNGS DISEASE, 4279
- PROLAPSE
  - AMEBIASIS, 4943

REFLUX
- PANCREATIC DUCT
  - ALCOHOL, 4635

REGENERATION
- LIVER
  - DIETARY FACTORS, 3962
  - DRUG EFFECTS ON, 4144, 4145
  - HORMONE CONTROL, 4141
  - NITROSAMINES, 4719

REGIONAL ENTERITIS
- SEE ALSO ENTERITIS
- APPENDICITIS
  - PERFORATION, 4527*
- HORMONE
  - CIRCADIAN RHYTHM, 4590*
- IMMUNOLOGY
  - IMMUNOSUPPRESSION, 4477*
- SMALL INTESTINE
  - NEOPLASMS, MALIGNANT, 4476*
- SURGERY
  - MALABSORPTION, 4475*

REJECTION
- LIVER
  - TRANSPLANTATION, 4666*

RENIN
- HEPATITIS, NONVIRAL, 4128
- LIVER
  - NECROSIS, 4128

RESPIRATORY SYSTEM
- ESOPHAGITIS, REFLUX
  - DISEASES ASSOCIATED WITH, 4318

RETICULOENDOTHELIAL SYSTEM
- DISEASE
  - MALABSORPTION, 4489*
- LIVER
  - CIRCULATION, 4222
  - SCANNING, SCINTILLATION, 4283

REVIEWS
- BLIND LOOP SYNDROME, 4445
- CIRRHOSIS
  - IMMUNOLOGY, 4762
- GASTRITIS, ATROPHIC, 4337
- HEPATITIS
  - IMMUNOLOGY, 4762
- HEPATITIS, VIRAL, 4748, 4753
- LIVER
  - DRUG EFFECTS ON, 4691
- PANCREAS
  - SECRETION, 4108, 4109
  - TRANSPLANTATION, 4625, 4627
- SALIVARY GLANDS
  - DISEASE, 4870
  - NEOPLASMS, 4871
- SPRUE, TROPICAL, 4511

REYES SYNDROME
- LIVER
  - ULTRASTRUCTURE, 4700

RIBOSOMES
- LIVER
  - AMINO ACIDS, 3946
  - ULTRASTRUCTURE, 3950

RISK FACTORS
- KERNICTERUS, 4702*

RUPTURE
- ARTERY
  - PSEUDOCYST, 4648
- DUODENUM
  - GANGRENE, 4464
  - TRAUMA, 4455
- JEJUNUM
  - DIVERTICULUM, 4444
  - TRAUMA, 4444
- PANCREAS
  - PSEUDOCYST, 4637
- PANCREATIC DUCT
  - PANCREATITIS, CHRONIC, 4658

SALIVA
- PROTEIN
  - GENETIC FACTORS, 4214
- SECRETION
  - ELECTROLYTE, 4060

- NERVOUS CONTROL, 4060, 4061

- SALIVARY GLANDS
    - AMYLASE
        - ILEUS, 4912
        - PERITONITIS, 4912
    - DISEASE
        - REVIEWS, 4870
    - ELECTROPHYSIOLOGY, 4219, 4220
    - MORPHOLOGY
        - ANTINEOPLASTIC AGENTS, 4102
        - ILEUS, 4912
        - PERITONITIS, 4912
    - NEOPLASMS
        - REVIEWS, 4871
    - NEOPLASMS, BENIGN, 4908
        - NUCLEIC ACIDS, 4862
    - NEOPLASMS, MALIGNANT, 4908
        - NUCLEIC ACIDS, 4862
    - ULTRASTRUCTURE
        - ADENOSINE TRIPHOSPHATASE, 4171

- SALMONELLOSIS
    - DIARRHEA
        - GASTROENTEROSTOMY, 4867
    - ENTEROCOLITIS, NECROTIZING
        - PREMATURITY, 4843*
    - PEPTIC ULCER
        - SURGERY, 4867

- SCANNING, SCINTILLATION
    - ABDOMEN
        - ABSCESS, 4904
    - AMEBIASIS
        - DIAGNOSIS, 4915*
    - GALLBLADDER
        - DIAGNOSIS, 4250
    - LIVER
        - ABSCESS, 4915*
        - DIAGNOSIS, 4229*
        - HODGKINS DISEASE, 4228*
        - LIVER DISEASE, 4281
        - METASTASES, 4226*, 4264
        - NEOPLASMS, 4236*
        - PSEUDOCYST, 4282
        - RETICULOENDOTHELIAL SYSTEM, 4283
        - TECHNIQUES, 4236*, 4249
        - TRAUMA, 4286
    - MEDIASTINUM
        - NEOPLASMS, MALIGNANT, 4283
    - PANCREAS
        - PANCREAS FUNCTION TESTS, 4234*
    - PANCREATITIS, CHRONIC, 4623

- SCHISTOSOMIASIS
    - APPENDICITIS
        - MORPHOLOGY, 4938
    - BLOOD
        - GLYCOPROTEINS, 4921*
    - IMMUNOLOGY
        - IMMUNOGLOBULINS, 4920*
    - LIVER
        - DRUG TREATMENT, 4931, 4932
        - ENZYMES, 4932
        - FIBROSIS, 4921*
        - IMMUNOGLOBULINS, 4920*

- SCLERODERMA
    - GASTROINTESTINAL, 4864
    - LIVER
        - NEOPLASMS, BENIGN, 4864

- SECRETIN
    - ADENYL CYCLASE
        - STIMULATION, 4055*
    - BLOOD
        - ZOLLINGER-ELLISON SYNDROME, 4855*
    - GUANYL CYCLASE
        - STIMULATION, 4055*
    - PANCREAS
        - SECRETION, 4113
    - PEPTIC ULCER
        - ACID SECRETION, 4409
    - SECRETION
        - PANCREAS, 4091*
    - SMALL INTESTINE
        - NERVOUS CONTROL, 4180
        - PHOSPHATASE, ALKALINE, 4163*
    - STOMACH
        - ACID SECRETION, 4372*, 4887
        - PEPSIN SECRETION, 4372*

- SECRETION
    - BILE
        - ANTISPASMODICS, 4150
        - INHIBITION, 4119*
        - PENTAGASTRIN, 4153
    - BILE ACIDS
        - DIET, 4118*
        - LIPIDS, 4120*
        - TRIGLYCERIDE, MEDIUM CHAIN, 4118*
    - GALLBLADDER
        - CHOLECYSTOKININ, 4094*
        - PANCREOZYMIN, 4094*
    - GASTRIN
        - HORMONE CONTROL, 4852*
    - INTESTINE
        - CHILDREN, 4262
        - TECHNIQUES, 4262
    - INTRINSIC FACTOR
        - HORMONE, 4077
        - VITAMIN B12, 4077
    - LIVER
        - DIETARY FACTORS, 4056*
        - PHYSICAL ACTIVITY, 4057*
        - TRAUMA, 4105
    - PANCREAS
        - ALCOHOL, 4111
        - ANTINEOPLASTIC AGENTS, 4102
        - CATECHOLAMINES, 4101
        - CHOLECYSTOKININ, 4094*, 4096*
        - DIETARY FACTORS, 4056*
        - DIGESTION, 4106
        - DRUG EFFECTS ON, 4098*
        - ELECTROLYTE, 4107
        - ENZYMES, 4106, 4603*
        - FEEDING, 4112
        - GLUCOSE, 4091*
        - HORMONE CONTROL, 4104, 4109
        - MALABSORPTION, 4603*
        - MOTILITY, 4112
        - NERVOUS CONTROL, 4095*, 4104, 4109, 4111
        - PANCREAS FUNCTION TESTS, 4234*
        - PANCREOZYMIN, 4094*, 4113
        - PENTAGASTRIN, 4096*
        - PHYSICAL ACTIVITY, 4057*
        - PROTEASE, 4103

        - PROTEIN, 4097*
        - REVIEWS, 4108, 4109
        - SECRETIN, 4091*, 4113
        - THYROID, 4090*
        - TRANSPLANTATION, 4110
        - ZINC, 4099*
    - PANCREATITIS
        - KININS, 4630*
    - PARATHYROID GLAND
        - CHOLELITHIASIS, 4800*
    - SALIVA
        - ELECTROLYTE, 4060
        - NERVOUS CONTROL, 4060, 4061
    - STOMACH
        - AMINO ACIDS, 4089
        - ATROPINE, 4073
        - CATECHOLAMINES, 4073
        - DRUG EFFECTS ON, 4071*
        - ELECTROLYTE, 4087
        - GASTRONE, 4062*
        - GLYCOPROTEINS, 3927*
        - HISTAMINE, 4076
        - INSULIN, 4086
        - INTRINSIC FACTOR, 4077
        - NERVOUS CONTROL, 4080
        - PENTAGASTRIN, 4071*
        - PHYSICAL ACTIVITY, 4057*
        - SEROTONIN, 4084
        - SPECIES DIFFERENCES, 4083
        - STRESS, 4088
        - TRANQUILIZERS, 4073
    - ZINC
        - DIETARY FACTORS, 4099*
        - INTESTINE, 4192

- SEDATIVES
    - LIVER
        - INJURY, 4131

- SEPSIS
    - BILIARY DISEASE, 4809
    - FISTULA
        - ANUS, 4574
    - LIVER DISEASE, 4809

- SEROLOGICAL DIAGNOSIS
    - HEPATITIS, VIRAL
        - MORPHOLOGY, 4729*

- SEROTONIN
    - ENDOTOXIN
        - SHOCK, 4844*
    - INTESTINE
        - CIRCULATION, 4201*
    - STOMACH
        - SECRETION, 4084

- SERUM
    - SEE BLOOD
    - ANTIGEN, AUSTRALIA
        - ISOLATION, 4223
    - GASTRIN
        - RADIOIMMUNOASSAY, 4246
    - ISOENZYMES
        - JAUNDICE, 4284

- SHIGELLOSIS
    - DYSENTERY, 4866
        - IMMUNOLOGY, 4865

- SHOCK
    - ABSORPTION
        - INTESTINE, 3982*
    - BLOOD
        - GASTRIN, 4081
    - ENDOTOXIN
        - BRADYKININ, 4844*
        - HISTAMINE, 4844*
        - SEROTONIN, 4844*

- SHORT BOWEL SYNDROME, 4449, 4457
    - SURGERY, 4424*

- SHUNT
    - VARICES
        - TECHNIQUES, 4784

- SIGMOID
    - SEE ALSO LARGE INTESTINE
    - ENDOSCOPY, 4270
    - PERFORATION, 4534
    - VOLVULUS, 4566

- SMALL INTESTINE
    - SEE ALSO DUODENUM, JEJUNUM, ILEUM
    - SEE ALSO INTESTINE
    - ABSORPTION
        - AMINO ACIDS, 4175
        - FOLIC ACID, 3975*
        - MACROMOLECULE, 4000
        - SODIUM, 4020
        - STEROID, 3988*
        - SUGAR, 4020, 4175
        - TRIGLYCERIDE, 3929*
        - WATER, 4050
    - ADENOSINE TRIPHOSPHATE
        - ALCOHOL, 4169*
    - AMINO ACIDS
        - METABOLISM, 4181
    - ANASTOMOSIS
        - HEALING, 4450
    - ANOMALY, CONGENITAL
        - ISCHEMIA, 4436
    - BACTERIA
        - STASIS, 4417*
        - SURGERY, 4417*
    - BILE ACIDS
        - BLIND LOOP SYNDROME, 4422*
    - CHEMICAL COMPOSITION
        - AGE FACTORS, 4200
    - CIRCULATION
        - ABSORPTION, 4206
        - MARKER STUDIES, 4205
    - DRUG METABOLISM
        - PHENOBARBITAL, 4196
    - ELECTROPHYSIOLOGY, 4043
    - EMBRYOLOGY
        - DIETARY FACTORS, 4200
    - ENDOMETRIOSIS
        - SURGERY, 4567
    - ENDOSCOPY, 4380
    - ENZYMES
        - AGE FACTORS, 4174, 4198
        - CHOLESTASIS, 4161*
        - CHYME, 4197
        - SURGERY, 4168*
    - FATTY ACIDS
        - METABOLISM, 4176
    - FISTULA, 4434, 4462

  FOREIGN BODIES, 4443
  UROGENITAL SYSTEM, 4545
FUNGUS
  SPRUE, TROPICAL, 4510
GALACTOSE
  METABOLISM, 4183
GLUCOSE
  METABOLISM, 4182, 4187, 4188
GLUCOSE-6-PHOSPHATASE
  SUGAR, 4177
GLYCOLYSIS, 4165*
  ENZYMES, 4188
GLYCOPROTEINS
  SYNTHESIS, 4166*, 4167*
HEMATOMA
  ANTICOAGULANTS, 4473
HERNIA, 4448
HISTOLOGY
  DIARRHEA, 4431
HORMONE
  CHROMATOGRAPHY, 4193
  PEPTIC ULCER, 4420*
INTUSSUSCEPTION
  ANGIOGRAPHY, 4414*
ION TRANSPORT
  ALCOHOL, 3976*
  PROSTAGLANDIN, 3993*
IRON
  ABSORPTION, 3984*
  ION TRANSPORT, 3997
ISCHEMIA
  ABSORPTION, 4447
  GLUCOSE, 4447
  ORAL CONTRACEPTIVES, 4432
KINETICS, CELL, 3974
  ANTINEOPLASTIC AGENTS, 4199
  RADIATION, 4199
LIPIDS
  ABSORPTION, 3996*
  SYNTHESIS, 4156*
  VITAMIN A, 4187
LYMPHANGIECTASIA
  PROTEIN-LOSING ENTEROPATHY, 4471
LYMPHATICS
  PROTEIN, 3996*
METABOLISM
  LACTIC ACID, 4179
  OXYGEN, 4179
MORPHOLOGY
  CELIAC DISEASE, 4519
  CHOLERA, 4413*
  CORTICOSTEROIDS, 4519
  DIARRHEA, 4835*, 4853*
  LYMPHANGIECTASIA, 4418*
  RADIATION, 3947
  TRIGLYCERIDE, 3929*
MOTILITY
  ADRENERGIC AGENTS, 4054
  CIRCULATION, 4028*
  CYCLIC ADENOSINE MONOPHOSPHATE, 4054
  MARKER STUDIES, 4050
  PROSTAGLANDIN, 3993*
MUCOSA
  ENZYMES, 3967
NEOPLASMS, MALIGNANT
  REGIONAL ENTERITIS, 4476*
OBSTRUCTION
  ANTICOAGULANTS, 4473
    HERNIA, 4472
    THERAPY, 4441
  PANCREOZYMIN
    NERVOUS CONTROL, 4180
  PERFORATION
    CROHNS DISEASE, 4483
  PHOSPHATASE, ALKALINE
    CHOLECYSTOKININ, 4163*
    SECRETIN, 4163*
  PNEUMATOSIS
    PERFORATION, 4459
  PROTEIN
    METABOLISM, 4190
    SYNTHESIS, 4178
  RADIOLOGY, 4278
    ASCARIASIS, 4925
    CYSTIC FIBROSIS, 4604*
  SECRETIN
    NERVOUS CONTROL, 4180
  STENOSIS
    RADIATION, 4429
  STRANGULATION
    HERNIA, 4461
  SUGAR
    ABSORPTION, 3979*
  SURGERY
    MORPHOLOGY, 3944
    MOTILITY, 3944
  ULTRASTRUCTURE
    ENZYMES, 4160*
    LYMPHANGIECTASIA, 4418*
    MALABSORPTION, 4506

SMOKING
  STOMACH
    ACID SECRETION, 4367*

SODIUM
  ABSORPTION
    SMALL INTESTINE, 4020
  SUGAR
    ABSORPTION, 4016

SONOGRAPHY
  SEE ECHOGRAPHY

SPECIES DIFFERENCES
  LIVER
    DRUG METABOLISM, 4137
  STOMACH
    SECRETION, 4083

SPHINCTER
  ESOPHAGUS
    MORPHOLOGY, 4040
    PRESSURE STUDIES, 4040
    RADIOLOGY, 4040

SPLENECTOMY
  HEPATITIS, CHRONIC
    IMMUNOSUPPRESSION, 4760*

SPRUE
  ENTERITIS
    SEQUELAE, 4508

SPRUE, TROPICAL
  REVIEWS, 4511
  SMALL INTESTINE

    - FUNGUS, 4510

- STARVATION
  - LIVER
    - MORPHOLOGY, 3949
  - SUGAR
    - ABSORPTION, 4019
  - THERAPY
    - COMPLICATIONS, 4845*

- STASIS
  - SMALL INTESTINE
    - BACTERIA, 4417*

- STEATORRHEA
  - DISEASES ASSOCIATED WITH
    - NEOPLASMS, MALIGNANT, 4456
  - DRUGS, 4456

- STEATOSIS
  - SEE FATTY LIVER

- STENOSIS
  - BILE DUCT
    - ETIOLOGY, 4606
    - NEOPLASMS, MALIGNANT, 4828
  - ILEUM
    - POTASSIUM, 4877
  - PYLORUS
    - ANOMALY, CONGENITAL, 4341
    - JAUNDICE, 4353
    - LIVER, 4353
    - POTASSIUM, 4877
    - RADIOLOGY, 4360
    - THERAPY, 4360
  - SMALL INTESTINE
    - RADIATION, 4429

- STEROID
  - FOLIC ACID
    - METABOLISM, 4170
  - LIVER
    - ULTRASTRUCTURE, 3948
  - MACROMOLECULE
    - ABSORPTION, 3988*
  - PELIOSIS HEPATIS
    - ETIOLOGY, 4712*
  - SMALL INTESTINE
    - ABSORPTION, 3988*
  - ULCERATIVE COLITIS, 4596

- STIMULATION
  - ADENYL CYCLASE
    - SECRETIN, 4055*
  - GUANYL CYCLASE
    - SECRETIN, 4055*

- STOMACH
  - SEE ALSO ANTRUM, PYLORUS
  - ACID SECRETION
    - ADENOSINE TRIPHOSPHATE, 4064*
    - ALCOHOL, 4352
    - BLOOD GROUP, 4367*
    - CHOLECYSTOKININ, 4887
    - CITRIC ACID, 4070*
    - CONSTITUTIONAL FACTORS, 4367*
    - CYCLIC ADENOSINE MONOPHOSPHATE, 4082
    - DIETARY FACTORS, 4383
    - ELECTROPHYSIOLOGY, 4078
    - FLUORIDE, 4074
    - HISTAMINE, 4072*, 4082
    - PEPTIC ULCER, 4367*
    - SECRETIN, 4372*, 4887
    - SMOKING, 4367*
    - SURGERY, 4066*
    - VAGOTOMY, 4372*
    - ZOLLINGER-ELLISON SYNDROME, 4887, 4890
  - ANOMALY, 3971
  - ANOMALY, CONGENITAL
    - OMPHALOCELES, 4860
    - PSEUDOCYST, 4624
  - CHLORIDE
    - CITRIC ACID, 4070*
  - CIRCULATION
    - DRUG EFFECTS ON, 4204, 4404
    - MORPHOLOGY, 3958
  - CROHNS DISEASE, 4482
    - MORPHOLOGY, 4486
  - CRYOTHERAPY
    - BLEEDING, 4879
  - ENDOSCOPY, 4240, 4277
    - COMPLICATIONS, 4399, 4439
    - PEPTIC ULCER, 4399
  - ENZYMES
    - ACHLORHYDRIA, 4361
    - NEOPLASMS, MALIGNANT, 4361
    - PEPTIC ULCER, 4361
    - VAGOTOMY, 4402
  - EROSIONS
    - DRUG TREATMENT, 4411
  - GASTRONE
    - IMMUNOFLUORESCENCE, 3924*
  - INJURY
    - DRUGS, 3970
  - ION TRANSPORT, 4006
    - ACIDITY, 4015
  - IRON
    - ABSORPTION, 3928*
    - METABOLISM, 3927*
  - MITOCHONDRIA
    - ENZYMES, 3968
  - MORPHOLOGY
    - ALCOHOL, 4352
  - MOTILITY, 4044
    - CYCLIC GUANOSINE MONOPHOSPHATE, 4041
    - DRUG EFFECTS ON, 4027*
    - FEEDING, 4026*
    - HYPOGLYCEMIA, 4837*
    - MARKER STUDIES, 4079
    - NERVOUS CONTROL, 4041
    - PYLOROPLASTY, 4412
    - TEMPERATURE, 4038
    - VAGOTOMY, 4412
  - MUCINS
    - IRON, 4065*
  - MUCOSA
    - BILE, 3925*
    - ELECTROPHYSIOLOGY, 3925*
    - ENDOCRINE SYSTEM, 3973
    - ENZYMES, 3961
    - GLYCOLYSIS, 4085
    - GLYCOPROTEINS, 4344
    - ION TRANSPORT, 3925*, 3985*
    - POTASSIUM, 4085
    - SURGERY, 4066*

  - ULTRASTRUCTURE, 3934*
- NEOPLASMS, BENIGN
  - RADIOLOGY, 4340
- NEOPLASMS, MALIGNANT
  - ACHLORHYDRIA, 4349
  - CYTOLOGY, 4336
  - ENDOSCOPY, 4285, 4336
  - EPIDEMIOLOGY, 4350, 4608
  - ETIOLOGY, 4608
  - FOOD ADDITIVES, 4342
  - GLYCOPROTEINS, 4344
  - HORMONE, 4420*
  - IMMUNOLOGY, 4851*
  - LACTATE DEHYDROGENASE, 4345
  - MOTILITY, 4347
  - RADIOLOGY, 4340
  - SURGERY, 4356
- NERVOUS CONTROL, 3972
- PEPSIN
  - CHEMICAL COMPOSITION, 4059
- PEPSIN SECRETION
  - SECRETIN, 4372*
  - VAGOTOMY, 4372*
- PEPSINOGEN
  - CHEMICAL COMPOSITION, 4059
- PERFORATION
  - NEONATE, 4351
  - SURGERY, 4351
  - SURVIVAL, 4351
- POLYPS
  - SURGERY, 4343, 4355
- PRESSURE STUDIES
  - PERISTALSIS, 4046
- RADIOLOGY, 4277
  - HYDROCARBONS, 4289
  - POISONING, 4289
- SECRETION
  - AMINO ACIDS, 4089
  - ATROPINE, 4073
  - CATECHOLAMINES, 4073
  - DRUG EFFECTS ON, 4071*
  - ELECTROLYTE, 4087
  - GASTRONE, 4062*
  - GLYCOPROTEINS, 3927*
  - HISTAMINE, 4076
  - INSULIN, 4086
  - INTRINSIC FACTOR, 4077
  - NERVOUS CONTROL, 4080
  - PENTAGASTRIN, 4071*
  - PHYSICAL ACTIVITY, 4057*
  - SEROTONIN, 4084
  - SPECIES DIFFERENCES, 4083
  - STRESS, 4088
  - TRANQUILIZERS, 4073
- SURGERY
  - ACIDOSIS, 4518
  - KIDNEY DISEASE, 4518
  - MALABSORPTION, 4518
  - TECHNIQUES, 4311
- ULCER
  - CATECHOLAMINES, 4408
  - DRUGS, 4390
  - ENDOSCOPY, 4271, 4400
  - EPIDEMIOLOGY, 4389
  - HEALING, 4346, 4398
  - NERVOUS SYSTEM, 4408
  - SIMULATION, 4398
- ULTRASTRUCTURE
  - ACIDITY, 4015
- VARICES
  - NEOPLASMS, MALIGNANT, 4335
  - RADIOLOGY, 4335

STOMACH ULCER
- SEE ALSO PEPTIC ULCER

STRANGULATION
- SMALL INTESTINE
  - HERNIA, 4461

STRESS
- GASTRITIS
  - SIMULATION, 4373*
- GASTROINTESTINAL
  - BLEEDING, 4339, 4348
- PEPTIC ULCER
  - BILE, 4373*
  - PREVENTION, 4373*, 4375
  - SIMULATION, 4373*, 4375
  - SURGERY, 4362*
  - SURVIVAL, 4362*
- STOMACH
  - SECRETION, 4088

STRICTURE
- BILE DUCT
  - SURGERY, 4822, 4832
- GASTROINTESTINAL
  - CYTOLOGY, 4276

SUGAR
- ABSORPTION
  - DIABETES, 4019
  - DRUG EFFECTS ON, 4019
  - SMALL INTESTINE, 3979*, 4020
  - SODIUM, 4016
  - STARVATION, 4019
- DIARRHEA
  - ETIOLOGY, 4886
- INTOLERANCE
  - CHILDREN, 4886
- SMALL INTESTINE
  - ABSORPTION, 4175
  - GLUCOSE-6-PHOSPHATASE, 4177

SULFOBROMOPHTHALEIN
- BILE
  - BLOOD VOLUME, 4135
- BILIARY TRACT
  - ABSORPTION, 4008
- DUBIN-JOHNSON SYNDROME, 4704*

SURGERY
- ABDOMEN
  - TRAUMA, 4882
- ACID SECRETION
  - STOMACH, 4066*
- AMPULLA OF VATER
  - NEOPLASMS, MALIGNANT, 4427, 4617
- ANORECTUM
  - NERVOUS CONTROL, 4583
- APPENDIX
  - CARCINOIDS, 4581
- BILE
  - VOMITING, 4299
- BILE DUCT
  - NEOPLASMS, MALIGNANT, 4617, 4807*
  - STRICTURE, 4822, 4832

- BILIARY TRACT
  - BACTERIA, 4416*
  - COMPLICATIONS, 4652
  - PANCREATITIS, 4652
- COLON
  - DIVERTICULUM, 4561
  - ENDOSCOPY, 4237
  - POLYPS, 4549
- CROHNS DISEASE
  - MALABSORPTION, 4509
  - MALNUTRITION, 4509
  - RECURRENCE, 4484
  - SEQUELAE, 4487
- DUODENUM
  - ANOMALY, CONGENITAL, 4425
  - NEOPLASMS, MALIGNANT, 4427
  - ULCER, 4382, 4393, 4394
- DYSPEPSIA, 4333
- ESOPHAGITIS, REFLUX, 4325, 4354
  - TECHNIQUES, 4303, 4310
- ESOPHAGUS
  - FISTULA, 4313
  - NEOPLASMS, MALIGNANT, 4301, 4302, 4313
  - POLYPS, 4305, 4343
  - TECHNIQUES, 4307, 4311
- GASTRECTOMY
  - MALABSORPTION, 4498*
- GASTRITIS, REFLUX, 4354
- GASTROINTESTINAL
  - BLEEDING, 4880
- HERNIA
  - SEQUELAE, 4462
- HERNIA, HIATUS, 4331
  - TECHNIQUES, 4312
- ILEUM
  - BILE ACIDS, 4421*, 4423*
  - SEQUELAE, 4445
- JEJUNUM
  - TECHNIQUES, 4446
- LARGE INTESTINE
  - DIVERTICULUM, 4565
  - ENDOMETRIOSIS, 4567
  - NEOPLASMS, MALIGNANT, 4524*
  - POLYPS, 4532
- LIVER
  - ABSCESS, 4698
  - NEOPLASMS, 4679
  - NEOPLASMS, MALIGNANT, 4697, 4708
  - TRAUMA, 4699, 4717
- MEGACOLON, 4544
  - NERVOUS CONTROL, 4583
- MUCOSA
  - STOMACH, 4066*
- OBESITY
  - COMPLICATIONS, 4840*
  - ELECTROPHYSIOLOGY, 4575
  - MALABSORPTION, 4840*
- PANCREAS
  - NEOPLASMS, MALIGNANT, 4605, 4617
  - PSEUDOCYST, 4616, 4622
  - TRAUMA, 4613, 4621
- PANCREATITIS, 4660
  - COMPLICATIONS, 4660
  - FAMILIAL FACTORS, 4651
- PANCREATITIS, CHRONIC, 4647
  - FAMILIAL FACTORS, 4645
  - RECURRENCE, 4628*
- PEPTIC ULCER
  - BLEEDING, 4371*
  - CHILDREN, 4396
  - COMPLICATIONS, 4410, 4434
  - DRAINAGE, 4365*
  - GASTRIN, 4397
  - MOTILITY, 4382
  - RADIOLOGY, 4334
  - RECURRENCE, 4392, 4406
  - SALMONELLOSIS, 4867
  - SEQUELAE, 4334, 4365*, 4380
  - STRESS, 4362*
  - SURVIVAL, 4410
  - TECHNIQUES, 4393, 4394
- RECTUM
  - NEOPLASMS, MALIGNANT, 4572
- REGIONAL ENTERITIS
  - MALABSORPTION, 4475*
- SHORT BOWEL SYNDROME, 4424*
- SMALL INTESTINE
  - BACTERIA, 4417*
  - ENDOMETRIOSIS, 4567
  - ENZYMES, 4168*
  - MORPHOLOGY, 3944
  - MOTILITY, 3944
- STOMACH
  - ACIDOSIS, 4518
  - KIDNEY DISEASE, 4518
  - MALABSORPTION, 4518
  - NEOPLASMS, MALIGNANT, 4356
  - PERFORATION, 4351
  - POLYPS, 4343, 4355
  - TECHNIQUES, 4311
- TECHNIQUES
  - ACHALASIA, 4322
  - HIRSCHSPRUNGS DISEASE, 4540
- ZOLLINGER-ELLISON SYNDROME, 4847*

SURVIVAL
- ESOPHAGUS
  - NEOPLASMS, MALIGNANT, 4319
- GASTROINTESTINAL
  - BLEEDING, 4376
- HEPATITIS, VIRAL
  - PREGNANCY, 4728*
- LARGE INTESTINE
  - NEOPLASMS, MALIGNANT, 4524*
- LIVER
  - AMEBIASIS, 4930
  - COMA, 4773*
- PEPTIC ULCER
  - BLEEDING, 4371*
  - STRESS, 4362*
  - SURGERY, 4410
- STOMACH
  - PERFORATION, 4351
- VARICES
  - PORTACAVAL SHUNT, 4782*

TELANGIECTASIA
- DUODENUM
  - BLEEDING, 4468
- GASTROINTESTINAL
  - BLEEDING, 4465

TEMPERATURE
- LIVER
  - PHYSICAL PROPERTIES, 3954
- MOTILITY
  - LARGE INTESTINE, 4038

        STOMACH, 4038

THERAPY
    SEE ALSO SPECIFIC THERAPEUTIC METHODS AND AGENTS
    CHOLEDOCHOLITHIASIS
        HEPARIN, 4797*
    CHOLELITHIASIS
        BILE ACIDS, 4794*
    DIARRHEA
        CHILDREN, 4834*, 4869
    GASTROINTESTINAL
        BLEEDING, 4376
        DISEASE, 4846*
    HEPATITIS, VIRAL
        TRANSFUSION, 4734*
    ILEUS
        CHILDREN, 4454
    LIVER
        AMEBIASIS, 4934
        COMA, 4694, 4733*, 4739*, 4792
    MALABSORPTION, 4505
    PYLORUS
        STENOSIS, 4360
    SMALL INTESTINE
        OBSTRUCTION, 4441
    STARVATION
        COMPLICATIONS, 4845*
    VARICES
        BLEEDING, 4330

THROMBOSIS
    LIVER
        ANGIOGRAPHY, 4683

THYROID
    NEOPLASMS, MALIGNANT
        DIARRHEA, 4892
        GASTRIN, 4852*
    SECRETION
        PANCREAS, 4090*

TISSUE ADHESIVES
    BILIARY TRACT
        ANGIOGRAPHY, 4255

TISSUE CULTURE
    INTESTINE
        VIRUS, 3942
    PANCREAS
        CELLS, 3937
    RECTUM
        MUCOSA, 3941

TOXICITY
    FOOD ADDITIVES, 4210

TOXIN
    CHOLERA
        INHIBITION, 4003
    MOTILITY
        INTESTINE, 4048

TRACE ELEMENT
    DEFICIENCY
        PANCREAS, 3932*
    ION TRANSPORT
        CHOLINE, 4125
    LIVER
        METABOLISM, 4125
    PANCREAS
        MORPHOLOGY, 4610

TRANQUILIZERS
    STOMACH
        SECRETION, 4073

TRANSFORMATION
    LYMPHOCYTE
        CIRRHOSIS, BILIARY, 4778*

TRANSFUSION
    ENTEROCOLITIS
        ISCHEMIA, 4586
        NEONATE, 4586
    HEPATITIS, VIRAL
        THERAPY, 4734*

TRANSPLANTATION
    ILEUM
        KINETICS, CELL, 4467
        MORPHOLOGY, 4467
        NEOPLASMS, MALIGNANT, 4440
    LIVER, 4689, 4786
        COMPLICATIONS, 4666*
        NEOPLASMS, MALIGNANT, 4666*
        REJECTION, 4666*
    PANCREAS, 4426
        REVIEWS, 4625, 4627
        SECRETION, 4110

TRANSPORT
    GALLBLADDER
        DRUG EFFECTS ON, 4017
        WATER, 4017

TRAUMA
    ABDOMEN
        SURGERY, 4882
    CHOLECYSTITIS, 4796*
    DUODENUM
        HEMATOMA, 4437
        RUPTURE, 4455
    JEJUNUM
        RUPTURE, 4444
    LIVER
        BLEEDING, 4799*
        DRAINAGE, 4133
        SCANNING, SCINTILLATION, 4286
        SECRETION, 4105
        SURGERY, 4699, 4717
    PANCREAS
        COMPLICATIONS, 4621
        LIVER, 4105
        SURGERY, 4613, 4621

TREATMENT
    SEE THERAPY

TRICHURIASIS
    EPIDEMIOLOGY, 4918*

TRIGLYCERIDE
    ABSORPTION, 4007
    INTOLERANCE
        ESOPHAGUS, 4297*
    SMALL INTESTINE
        ABSORPTION, 3929*

- MORPHOLOGY, 3929*

TRIGLYCERIDE, MEDIUM CHAIN
- BILE ACIDS
  - SECRETION, 4118*

TRYPSIN
- PANCREATITIS
  - SIMULATION, 4657

TUBERCULOSIS
- GASTROINTESTINAL
  - RADIOLOGY, 4842*

ULCER
- DUODENUM
  - ACID SECRETION, 4385, 4386, 4391, 4401
  - AGE FACTORS, 4391
  - ALKALOSIS, 4401
  - ANEMIA, SICKLE CELL, 4403
  - ANESTHETICS, LOCAL, 4377
  - ANTACIDS, 4377
  - CHILDREN, 4396
  - CONSTITUTIONAL FACTORS, 4391
  - ENDOSCOPY, 4381
  - EPIDEMIOLOGY, 4385
  - GASTRIN, 4397
  - HEALING, 4381
  - ISCHEMIA, 4403
  - PEPSIN SECRETION, 4405
  - PERFORATION, 4370*, 4459
  - RECURRENCE, 4406
  - SEQUELAE, 4385
  - SIMULATION, 4370*
  - SURGERY, 4382, 4393, 4394
  - VAGOTOMY, 4387
- STOMACH
  - CATECHOLAMINES, 4408
  - DRUGS, 4390
  - ENDOSCOPY, 4271, 4400
  - EPIDEMIOLOGY, 4389
  - HEALING, 4346, 4398
  - NERVOUS SYSTEM, 4408
  - SIMULATION, 4398

ULCERATIVE COLITIS
- SEE ALSO COLITIS
- BILE DUCT
  - NEOPLASMS, MALIGNANT, 4592, 4807*
- CHILDREN, 4591*
  - PROGNOSIS, 4598
- COLON
  - KININS, 4589*
- COLOSTOMY, 4595
- DIAGNOSIS, 4261
  - EPIDEMIOLOGY, 4587*
- DISEASES ASSOCIATED WITH
  - NEOPLASMS, MALIGNANT, 4592
- FOLIC ACID
  - MALABSORPTION, 4492*
- HORMONE
  - CIRCADIAN RHYTHM, 4590*
- ILEOSTOMY
  - TECHNIQUES, 4599
- IMMUNOSUPPRESSION, 4593
- MUSCULOSKELETAL SYSTEM
  - FAMILIAL FACTORS, 4594
- RADIOLOGY, 4244
- RECTUM
  - ION TRANSPORT, 4530*, 4580
  - KINETICS, CELL, 4588*
- STEROID, 4596

ULTRASTRUCTURE
- ANTIGEN, AUSTRALIA
  - CIRRHOSIS, BILIARY, 4781*
- APPENDIX
  - IMMUNOGLOBULINS, 3933*
  - VIRUS, 4539
- COLON
  - MUCOSA, 3930*
  - POLYPS, 3930*
- HEPATITIS, CHRONIC
  - ANTIGEN, AUSTRALIA, 4737*
- HEPATITIS, VIRAL
  - ANTIGEN, AUSTRALIA, 4737*
- LARGE INTESTINE
  - AMEBIASIS, 4531
- LIVER
  - AFLATOXIN, 3964
  - ALCOHOL, 3953
  - CELL, 4132
  - DIETARY FACTORS, 4216
  - DRUG EFFECTS ON, 3948
  - ETHIONINE, 3945
  - LIPIDS, 3926*
  - LIPOPROTEINS, 4216
  - REYES SYNDROME, 4700
  - RIBOSOMES, 3950
  - STEROID, 3948
- NERVOUS SYSTEM
  - WILSONS DISEASE, 4686
- PANCREATITIS
  - SIMULATION, 4655
- PANCREATITIS, CHRONIC
  - CALCIFICATION, 4650
- SALIVARY GLANDS
  - ADENOSINE TRIPHOSPHATASE, 4171
- SMALL INTESTINE
  - ENZYMES, 4160*
  - LYMPHANGIECTASIA, 4418*
  - MALABSORPTION, 4506
- STOMACH
  - ACIDITY, 4015
  - MUCOSA, 3934*

URINE
- COPPER
  - LIVER DISEASE, 4670*

UROGENITAL SYSTEM
- CROHNS DISEASE
  - COMPLICATIONS, 4481
- FISTULA
  - CROHNS DISEASE, 4481
- LARGE INTESTINE
  - FISTULA, 4545, 4584
- SMALL INTESTINE
  - FISTULA, 4545

VACCINE
- ENTERITIS
  - PREVENTION, 4878
- HEPATITIS, SERUM
  - PREVENTION, 4738*

VAGOTOMY

ALCOHOL
    ABSORPTION, 4357
  DUODENUM
    ULCER, 4387
  ESOPHAGUS
    PRESSURE STUDIES, 4324, 4407
  INTESTINE
    ION TRANSPORT, 4368*
  PEPTIC ULCER
    ACID SECRETION, 4402
    PRESSURE STUDIES, 4407
    TECHNIQUES, 4402
  STOMACH
    ACID SECRETION, 4372*
    ENZYMES, 4402
    MOTILITY, 4412
    PEPSIN SECRETION, 4372*
  WATER
    ABSORPTION, 4368*

VARICES
  BLEEDING
    THERAPY, 4330
  ESOPHAGUS
    BLEEDING, 4330, 4777*
    VASOPRESSIN, 4777*
  PORTACAVAL SHUNT
    SURVIVAL, 4782*
  SHUNT
    TECHNIQUES, 4784
  STOMACH
    NEOPLASMS, MALIGNANT, 4335
    RADIOLOGY, 4335

VASOPRESSIN
  CIRCULATION
    PANCREATITIS, 4632*
  ESOPHAGUS
    VARICES, 4777*
  GASTRITIS
    BLEEDING, 4363*
  PEPTIC ULCER
    BLEEDING, 4363*

VILLI
  ATROPHY
    DRUG ABSORPTION, 4490*

VIRUS
  ABSORPTION
    ILEUM, 3938
  APPENDIX
    ULTRASTRUCTURE, 4539
  INTESTINE
    TISSUE CULTURE, 3942
  INTUSSUSCEPTION
    ETIOLOGY, 4539
  LIVER
    NECROSIS, 4680
    NEOPLASMS, BENIGN, 4680

VITAMIN
  DEFICIENCY
    PANCREATITIS, CHRONIC, 4640

VITAMIN A
  ABSORPTION
    CHOLESTYRAMINE, 4012
    LIGNIN, 4012
  DEFICIENCY
    MUCOPOLYSACCHARIDE, 4576
  LIVER
    MORPHOLOGY, 3969
  METABOLISM
    DIETARY FACTORS, 4194
    INTESTINE, 4194
  MUCOPOLYSACCHARIDE
    METABOLISM, 4576
  SMALL INTESTINE
    LIPIDS, 4187

VITAMIN B12
  ABSORPTION
    ACHLORHYDRIA, 4366*
    GASTRECTOMY, 4366*
    HYPOCHLORHYDRIA, 4366*
    PANCREAS DISEASE, 4108
  INTRINSIC FACTOR
    SECRETION, 4077
  MALABSORPTION
    BACTERIA, 4522
    BLIND LOOP SYNDROME, 4522
    CYSTIC FIBROSIS, 4612
    GIARDIASIS, 4913*

VITAMIN C
  MOTILITY
    ILEUM, 4039

VITAMIN D
  DUODENUM
    KINETICS, CELL, 4164*

VOLVULUS
  MECKELS DIVERTICULUM
    COMPLICATIONS, 4452
  SIGMOID, 4566

VOMITING
  BILE
    HERNIA, HIATUS, 4299
    SURGERY, 4299

WATER
  ABSORPTION
    COLON, 3987*
    HORMONE CONTROL, 3978*
    HORMONE EFFECTS ON, 3986*
    LARGE INTESTINE, 3986*, 4050
    SMALL INTESTINE, 4050
    VAGOTOMY, 4368*
  BILIARY TRACT
    ABSORPTION, 4008
  GALLBLADDER
    TRANSPORT, 4017
  ION TRANSPORT
    COLON, 4022
  METABOLISM
    HEPATECTOMY, 4149

WILSONS DISEASE
  BILE
    COPPER, 4665*
  BILE ACIDS
    COPPER, 4667*
  DIAGNOSIS, 4670*
  DRUG TREATMENT
    BILE ACIDS, 4667*

  LYSOSOMES
    COPPER, 4665*
  NERVOUS SYSTEM
    ULTRASTRUCTURE, 4686

ZINC
  ABSORPTION
    DIETARY FACTORS, 3983*
    INTESTINE, 3983*
  BLOOD
    CIRRHOSIS, 4791
    HEMOCHROMATOSIS, 4791
    HEPATITIS, 4791
  PANCREAS
    SECRETION, 4099*
  SECRETION
    DIETARY FACTORS, 4099*
    INTESTINE, 4192

ZOLLINGER-ELLISON SYNDROME
  BLOOD
    GASTRIN, 4848*, 4854*, 4855*, 4890
    SECRETIN, 4855*
  HORMONE CONTROL
    GASTRIN, 4854*
  HYPOGLYCEMIA, 4837*
  PROGNOSIS
    GASTRIN, 4841*
  STOMACH
    ACID SECRETION, 4887, 4890
  SURGERY, 4847*

ZYMOGENS
  PROTEASE
    SYNTHESIS, 4103

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PREFACE

GASTROENTEROLOGY ABSTRACTS and CITATIONS is a publication of the National Institute of Arthritis, Metabolism and Digestive Diseases. This specialized information medium has been initiated to fill an existing great need in the field of gastroenterology and to assist the Institute in meeting its obligations to foster and support laboratory and clinical research into the nature, causes, and therapy of diseases of the gastrointestinal tract. Publication GASTROENTEROLOGY ABSTRACTS and CITATIONS makes available citations of all current papers relevant to this field from medical journals published throughout the world. Approximately one-third of the citations dealing with the major aspects of gastroenterology have accompanying abstracts.

The issuing of GASTROENTEROLOGY ABSTRACTS and CITATIONS under the auspices of the National Institute of Arthritis, Metabolism, and Digestive Diseases will provide a much needed current awareness tool to scientists and will facilitate greater integration of research and clinical efforts in this field. The number and great diversity of publications in the area of gastroenterology makes it imperative that an appropriate service be available to investigators and practitioners so that they may be apprised of progress with a minimum of delay. Our aim is to provide the readers with a readily systematized compilation of current published work. The publication will provide the greatest usefulness if these interested investigators will contribute their ideas and comments for consideration whenever possible.

GASTROENTEROLOGY ABSTRACTS and CITATIONS is published monthly and includes citations and abstracts from the biomedical world literature as they are currently received. Volume 7 will appear in, and be dated, 1973. There will be no hiatus in literature coverage from Volume 6 which was dated 1971. In addition, yearly cumulated subject and author indexes are published.

This publication is available free to National Institutes of Health grantees and contractors working in the field of gastroenterology and libraries of medical schools. Requests from these qualified individuals to receive free copies of this publication must include their grant or contract number and the title of their project. These requests as well as address changes and other communications should be addressed to:

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CONTENTS

	Abstracts, Citations	Page
PRE-CLINICAL SCIENCES		
Morphology, Cellular Structure and Histochemistry	4946-4975	469
Absorption--Excretion--Transport	4976-5000	472
Motility	5001-5012	477
Secretion and Metabolism	5013	479
Stomach	5014-5042	480
Pancreas	5043-5053	485
Hepatobiliary Tract	5054-5092	487
Intestine	5093-5107	496
General	5108-5120	498
DIAGNOSTIC PROCEDURES	5121-5177	501
GASTROINTESTINAL DISEASES		
Esophagus	5178-5190	508
Stomach	5191-5215	509
Peptic Ulcers	5216-5236	512
Small Intestine	5237-5268	513
Malabsorption	5269-5283	516
Large Intestine	5284-5325	518
Ulcerative Colitis	5326-5334	522
Pancreas	5335-5352	523
Pancreatitis	5353-5363	524
Liver and Biliary Tract	5364-5380	525
Hyperbilirubinemic States	5381-5384	528
Nonviral Hepatitis and Hepatic Injury	5385-5388	528
Acute Viral Hepatitis	5389-5411	529
Chronic Hepatitis	5412-5422	534
Alcoholic Liver Disease	5423-5425	535
Cirrhosis	5426-5434	536
Gallbladder and Biliary Tract Diseases	5435-5452	538
General	5453-5490	540
Parasitology	5491-5518	543
Regional Enteritis	5519-5527	546
AUTHOR INDEX		
SUBJECT INDEX		

The Secretary of the Department of Health, Education, and Welfare has determined that the publication of this periodical is necessary in the transaction of the public business required by law of this Department. Use of funds for printing this periodical has been approved by the Director of the Office of Management and Budget through April 30, 1975.

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NOTE

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LANGUAGE ABBREVIATIONS

Afr.	Afrikaans
Ar.	Arabic
Bul.	Bulgarian
Ch.	Chinese
Cz.	Czech
Dan.	Danish
Dut.	Dutch
E.	English
Eston.	Estonian
Fin.	Finnish
Fl.	Flemish
Fr.	French
Ger.	German
Gr.	Greek
Heb.	Hebrew
Hun.	Hungarian
Ic.	Icelandic
In.	Indonesian
It.	Italian
Jap.	Japanese
Kor.	Korean
Latv.	Latvian
Lith.	Lithuanian
Nor.	Norwegian
Pol.	Polish
Por.	Portuguese
Rum.	Rumanian
Rus.	Russian
Ser.	Serbo-Croatian
Sl.	Slovak
Sp.	Spanish
Sw.	Swedish
Th.	Thai
Turk.	Turkish
Uk.	Ukrainian
Viet.	Vietnamese

ABBREVIATIONS USED IN ABSTRACTS

ACTH	adrenocorticotropic hormone
ADP	adenosine diphosphate
AMP	adenosine monophosphate
ATP	adenosine triphosphate
C	degrees centigrade
cm	centimeter(s)
CNS	central nervous system
cpm	counts per minute
DNA	deoxyribonucleic acid
e.g.	for example
g	gram(s)
μg	microgram(s)
hr	hour(s)
i.m.	intramuscular
i.p.	intraperitoneal
IU	international unit(s)
i.v.	intravenous
kg	kilogram(s)
LD_{50}	median lethal dose(s)
m	meter(s)
M	molar
mEq	milliequivalent(s)
mM	millimolar
μM	micromolar
mC,μC	milli-,microcurie(s)
mg	milligram(s)
min	minute(s)
ml	milliliter(s)
mm	millimeter(s)
MTD	maximum tolerated dose
ng	nanogram (10^{-9})
pg	picogram (10^{-12})
p.o.	orally
ppm	parts per million
r	Roentgen
RBC	red blood cells (erythrocytes), red blood count
resp.	respectively
Rev.	review (only in citations)
RNA	ribonucleic acid
s.c.	subcutaneous
sec	second(s)
U	unit(s)
UV	ultraviolet
WBC	white blood cells (leukocytes), white blood count
wk	week
wt	weight
yr	year(s)

PRE-CLINICAL SCIENCES

MORPHOLOGY, CELLULAR STRUCTURE AND HISTOCHEMISTRY

6 LIVER MORPHOLOGY AND GALLSTONE FORMATION
IN HAMSTERS AND MICE TREATED WITH CHENO-
XYCHOLIC ACID. *(E.)* Bergman, F.; Van Der
den; W. (Dept. Pathol., Univ. Umea., Sweden).
a Pathol. Microbiol. Scand. [*A*] 81:213-221, 1973.

sters fed a lithogenic diet showed a significant-
stronger tendency to gallstone formation if the
t was supplemented with 0.5% chenodeoxycholic
d. In hamsters and in mice the addition of
nodeoxycholic acid to the diet resulted in a
id and drastic shift toward this acid in the
e. Mice were fed normal chow with supplements
1% cholesterol, 1% cholesterol plus 0.5% cholic
d and 1% cholesterol plus 0.5% chenodeoxycholic
d, resp. After 4 months, slight fatty degenera-
n with occasional cholesterol crystals were ob-
ved in the livers of the animals of the first
up. In the second group there was marked fatty
eneration with a massive accumulation of choles-
ol crystals. In the third group, the liver his-
ogy was essentially normal. Gallstones were pre-
t in the second group and absent in the other two.
a regression experiment, hamsters were first fed
w supplemented with cholesterol and cholic acid.
er 1 month they were divided into 2 groups which
e fed chow supplemented with 0.5% chenodeoxycholic
d and unsupplemented chow, resp. When the animals
e sacrificed 40 days later the massive accumula-
n of cholesterol crystals, induced by the choles-
ol cholic acid containing diet, was still present
all animals fed chow. In the hamsters fed chow
plemented with chenodeoxycholic acid there were
less such crystals. With chow as the basic diet,
henodeoxycholic acid supplement aids the hamster
freeing itself from excess cholesterol. On the
er hand, inflammatory changes of the liver were
sent in many of the chenodeoxycholic acid-treated
sters but missing in the controls. The same ex-
iment was repeated with a gallstone-provoking diet
the basic diet during the regression period. With
s basic diet, chenodeoxycholic acid had no effect
the accumulation of cholesterol crystals in the
er. It did, however, result in the development
inflammatory changes in the liver, comparable to
se observed in animals fed lithocholic acid.
results of these experiments suggest that the
ic diet may be an important factor and that
ient diets should at the very least be properly
orded. In view of the possible hepatic toxicity
chenodeoxycholic acid, the importance of careful
trol of liver function and morphology during
use of the drug is stressed.

47 OBSERVATIONS ON THE ULTRASTRUCTURE OF
OXYNTIC CELLS IN ALCOHOL-FED DOGS. *(E.)*
llibridge, C. B.; Yoshimori, M.; Chey, W. Y.
nesee Hosp., Rochester, N.Y.). *Am. J. Dig. Dis.*
(5):443-454, 1973.

effect on gastric mucosa of chronic adminis-
ation of ethanol in excessive amounts was studied
ctron microscopically in nutritionally replete
dogs. Point volumetric analysis was performed on electron micrographs of a control group and an alcohol-fed group of dogs. The mean volume of oxyntic cells increased 3-fold. Mitochondria appeared damaged and their mean volume increased from 0.539 to 1.531 cu μ. The mean number of mitochondria/cell remained unchanged in the alcohol-fed dogs. The change in mitochondrial volume is probably best explained by assuming they are only passively swollen. This is supported by the observation that the density of mitochondrial matrix is decreased in the larger mitochondria. Thus, the actual mass of enzyme material/mitochondrion may be unchanged. The vesicotubules of the secretory tubular apparatus assumed a predominantly flattened vesicular configuration but increased in number approximately 3-fold. This hyperplasia of vesicotubules of oxyntic cells in the alcohol-fed group represents a response different from the reported hyperplasia of smooth endoplasmic reticulum in other tissues influenced by chronic alcohol administration. Zymogenic cells appeared unchanged. These alterations in electron microscopic morphology suggest that the oxyntic cell is quite susceptible to ethanol, and that the previously reported increase in maximal acid output results from mitochondrial hypertrophy and vesicotubular hyperplasia.

4948 INTESTINAL GOBLET CELL MUCUS: ISOLATION AND IDENTIFICATION BY IMMUNOFLUORESCENCE OF A GOBLET CELL GLYCOPROTEIN.
(E.) Forstner, J.; Taichman, N.; Kalnins, V.; Forstner, G. (Toronto Western Hosp., Canada). *J. Cell Sci.* 12(2): 585-602, 1973.

A high-molecular-weight glycoprotein (HMG), representing the majority of the soluble glycoprotein hexosamine and hexose in the intestine, was isolated by Sepharose $_4$B chromatography from high-speed supernatants of rat small intestinal homogenate. Fluorescein-labelled globulin, from rabbit antiserum produced against HMG, specifically stained supranuclear mucus vesicles of goblet cells in small intestine and colon as well as gastric pit cells in the body of the stomach and mucus-producing cells in the sublingual salivary gland, thereby indicating that HMG has antigenic determinants which are shared by mucus throughout the gastrointestinal tract. A single precipitin line was found when HMG was tested against its antibody by agar immunodiffusion and immunoelectrophoresis. No cross-reactivity was observed between antibody and rat serum or extracts from microvillus membrane, human colon and pig intestine. However, this does not necessarily imply species selectivity. Precipitin lines which fused with the HMG precipitin arc in apparent identity were observed with antigens in intestinal lumen washings, and in small-molecular-weight fractions from intestinal cell sap. When studied by cellulose acetate electrophoresis, cetyl trimethylammonium bromide precipitation and precursor labelling with $[I-^{14}C]$glucosamine, HMG behaved as a single homogeneous glycoprotein free of detectable protein contamination. These results imply that HMG is a major component of goblet-cell mucus in the small intestine. HMG is the first glycoprotein, isolated without the aid of proteolytic agents, which has been specifically identified as a product of the goblet cell. It is suggested that HMG may be a highly polymerized storage mucin; if so, antigenically related small-molecular-weight glycoproteins in another fraction, also isolated on a Sepharose $_4$B chromatograph, might constitute rapidly labeled and secreted goblet cell glycoproteins identified by autoradiography.

4949 RNA AND DNA OF GASTRIC AND DUODENAL MUCOSA IN ANTRECTOMIZED AND GASTRIN-TREATED RATS. *(E.)* Johnson, L. R.; Chandler, A. M. (Univ. Oklahoma Health Sci. Ctr., Oklahoma City). *Am. J. Physiol.* 224(4):937-940, 1973.

Male rats were antrectomized or sham operated by making and repairing a gastrostomy through a midline incision. One month later the animals were killed, and the RNA and DNA contents of the oxyntic glandular and duodenal mucosa were determined. Approximately one-half of the antrectomized animals were injected i.p. with pentagastrin (250 μg/kg) 3 times during the 24 hr prior to sacrifice. In the antrectomized animals gastric mucosal RNA and DNA were equal to 65 and 75%, resp., of the levels in the sham-operated controls. Pentagastrin increased gastric mucosal RNA to 90% of control levels but had no effect on DNA. Duodenal mucosal RNA was decreased to 75% and DNA to 60% by antrectomy. Pentagastrin restored these levels to 110 and 78% of control values, resp. All of these changes were significant statistically. These results suggest that: the harmful effects of antrectomy on gastric and duodenal mucosa are partly a result of the absence of endogenous antral gastrin; the RNA and DNA content of gastric and duodenal mucosa is dependent on gastrin; gastrin affects RNA more rapidly than DNA; stimulation by gastrin of RNA synthesis may result in cell division; and gastrin is a trophic hormone needed to maintain normal gastric duodenal mucosa in the rat.

4950 THE KINETICS OF CELLULAR RECOVERY IN LOCALLY X-IRRADIATED RAT ILEUM. *(E.)* Poulakas, L.; Osborne, J. W. (Radiat. Res. Lab., Univ. Iowa, Iowa City). *Radiat. Res.* 53(3):402-413, 1973.

The onset and progression of recovery in a 2.5 cm segment of rat ileum given 1000 R X-radiation and the influence on adjacent but shielded segments were studied. The exteriorized intestinal segment was irradiated or sham-irradiated and returned to the peritoneal cavity. At 3, 5, 7, 14, 17, 21, 28, and 35 days after irradiation, the treated and control animals were given tritiated thymidine (6.0 Ci/mM, 50 μCi/100 g, i.p.) and killed 1 hr later. The irradiated or sham-irradiated segment and segments of shielded intestine 5 cm and 10 cm distal to the irradiated or sham-irradiated segments were removed and appropriately processed for histologic and autoradiographic studies. Crypt regeneration began slowly but the rate of recovery gradually increased, reaching a maximum 5-7 days after irradiation. The number of total cells/crypt section in both the irradiated and shielded segments of intestine was greater than that in control segments at all times after irradiation. Differences between treated and control values decreased with time after irradiation. The percent of labeled cells/crypt section were the same in shielded and control segments. The results obtained indicate that local irradiation of the intestine does not change the relative size of the proliferative compartment. This is in contrast to the situation which exists after whole-body exposure to 1000 R in which the entire crypt becomes proliferative. The mucosal cell proliferation rate is slightly increased in a shielded ileal segment 5 cm from the site of local irradiation, suggesting that there is an attempt by adjacent unirradiated tissue to compensate for the temporary loss of functional crypts. The compensatory increase in cellularity in both the irradiated and shielded intestine, followed by a decrease toward control values with time after irradiation and increased distance from the irradiation site, suggests a local, temporary influence associated with changes in crypt cell proliferation. It is suggested that the functional status of the intestine determines the mechanism regulating the kinetics of crypt regeneration. Where irradiation is only local, residual intestine can maintain the animal by local compensatory adjustments in its crypt cell population.

4951 MODE OF ACCUMULATION OF IODOPHENYLALANINES IN THE EXOCRINE PANCREAS AND CERTAIN TUMOU *(E.)* Blomquist, L. (Univ. Uppsala, Sweden). *Acta. Radiol. Supp.* 322:1-140, 1972.

4952 THE PART OF HISTOENZYMOLOGY IN EXPERIMENTA LIVER RESEARCH. *(Fr.)* Gerzeli, G.; Gervaso, M. V. (Univ. Pavia, Italy). *Ann. Histochem* 18(1):29-34, 1973.

4953 LOCALIZATION OF THE 5'-NUCLEOTIDASE IN THE NEO-NATAL LIVER. ELECTRON MICROSCOPICAL OBSERVATION DETAILS. *(E.)* Turchini, J. P.; Pourhad R.; Geneix, A. (no affil.). *Ann. Histochem.* 18(1): 35-40, 1973.

4954 LIVER CYTOLOGY. *(E.)* Myron, J.; Johansen, S. (Ulleval Hosp., Oslo, Norway). *Abdom. Surg.* 15(3):65-68, 1973.

4955 QUANTITATIVE STUDIES ON THE POSTNATAL GROWTH OF RATTUS NORVEGICUS BERKENHOUT UNDER NORMAL AND CHANGED STATIC CONDITIONS. IV. ABDOMINAL ORGANS (GASTROINTESTINAL TRACT). *(Ger.)*

ghanel, J.; Schumacher, G. H.; Schultz, E. (Anat. st., Univ. Rostock, Germany). *Acta Anat.* 81(4): -639, 1972.

56 THE SYMPATHETIC INNERVATION OF THE GASTRO-INTESTINAL TRACT OF MAMMALS. *(Rus.)* khina, E. M. (B. I. Lavrentiev Neurohistological ., Moscow, USSR). *Biull. Eksp. Biol. Med.* 75(3): -106, 1973.

57 STRUCTURE OF EMBRYONIC CELL POPULATIONS IN LIVER AND PRIMARY MONOLAYER CULTURES. *r.)* Neupert, G. (Pathol. Inst., Friedrich Schil- Univ., Jena, Germany). *Acta Morphol. Acad. Sci. g.* 19(3):247-257, 1971.

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50 DISTRIBUTION AND PROPERTIES OF DNA POLYMERASE IN SUBCELLULAR FRACTIONS OF RAT ESTINAL MUCOSA. *(E.)* Poulson, R.; Krasny, J.; rsky, S.H. (Univ. Br. Columbia, Vancouver, Can-). *Biochim. Biophys. Acta* 299(4):533-544, 1973.

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2 AN ULTRASTRUCTURAL AND MORPHOMETRIC STUDY OF THE LIVER OF THE LACTATING COW IN RVATION KETOSIS. *(E.)* Reid, I. M. (Inst. Res. mal Dis., Compton, England). *Exp. Mol. Pathol.* 3):316-330, 1973.

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4965 EFFECT OF THYROCALCITONIN ON STATE OF THE BONDS BETWEEN LIVER CELLS. *(E.)* Kashulina, A. P.; Tereshchenko, I. P.; Boriskin, A. I.; Golovanov, M. V.; Rybakova, L. I. (P. A. Gertsen Moscow Oncologic Res. Inst.). *Bull. Exp. Biol. Med.* 74(10):1319-1321, 1973.

4966 EXPERIMENTAL LIVER FINDINGS INDUCED BY ANTITUMOR AGENTS IN THE CHICK EMBRYO IN SITU. HISTOPATHOLOGICAL STUDY. NOTE I.: DAUNOMYCIN. *(It.)* Pannuti, F.; Barboni, F. (Dept. Gen. Pathol., G. D'Annunzio Free Univ., Chieti, Italy). *Fegato* 18(1):5-15, 1972.

4967 EXPERIMENTAL LIVER FINDINGS INDUCED BY ANTITUMOR AGENTS IN CHICK EMBRYOS IN SITU. HISTOPATHOLOGICAL STUDY. NOTE II: ADRIAMYCIN. *(It.)* Pannuti, F.; Barboni, F. (Dept. Gen. Pathol., G. D'Annunzio Free Univ., Chieti, Italy). *Fegato* 18(1):17-28, 1972.

4968 EXPERIMENTAL LIVER FINDINGS INDUCED BY ANTITUMOR AGENTS IN CHICK EMBRYOS IN SITU. HISTOPATHOLOGICAL STUDY. NOTE III: THIO-TEPA. *(It.)* Pannuti, F.; Barboni, F. (Dept. Gen. Pathol., G. D'Annuzio Free Univ., Chieti, Italy). *Fegato* 18(1):29-38, 1972.

4969 HISTOCHEMICAL STUDY OF THE ACTIVITIES OF SOME ENZYMES DURING PROLONGED TREATMENT WITH RIFAMPICIN AND ISONICOTINIC ACID HYDRAZIDE. EXPERIMENTAL RESEARCH. *(It.)* Terragna, A.; Rossolini, A.; Cellesi, C. (Inst. Clin. Infect. Dis., Univ. Siena, Italy). *Fegato* 18(1):89-99, 1972.

4970 GLYCOPROTEINS FROM BOVINE DUODENAL MUCOSA. *(E.)* Cetta, G.; Pallavicini, G.; Calatroni, A.; Castellani, A. A. (Univ. Pavia, Italy). *Ital. J. Biochem.* 21(5-6):275-288, 1972.

4971 A COMPARATIVE HISTOCHEMICAL STUDY OF RAT LIVERS IN ALPHA-NAPHTHYL-ISO-THIOCYANATE (ANIT) AND DL-ETHIONINE INTOXICATION. *(E.)* Chou, S. T.; Gibson, J. B. (Univ. Hong Kong) *J. Pathol.* 108(1):73-83, 1972.

4972 PASSAGE OF CYTOPLASMIC LIPID INTO INTERPHASE NUCLEI IN PRENEOPLASTIC RAT LIVER. *(E.)* Karasaki, S. (Univ. Montreal, Canada). *J. Ultrastruct. Res.* 42(5-6):463-478, 1973.

4973 ELECTRON MICROSCOPIC AUTORADIOGRAPHY OF MOUSE LARGE INTESTINAL EPITHELIUM FOLLOWING H^3-GLUCOSE ADMINISTRATION. *(Rus.)* Zufarov, K. A.; Baibekov, I. M. (Tashkent Med. Inst., USSR). *Biull. Eksp. Biol. Med.* 75(4):116-118, 1973.

4974 ULTRASTRUCTURE OF THE SWINE LIVER WHEN KEPT

FOR 24 HOURS WITH SIMPLE HYPOTHERMIA. *(Ger.)* Totovic, V.; Lagace, R.; Lie, T. S.; Busselberg, E.; Yamamoto, T. (Pathol. Inst., Univ. Bonn, Germany). *Res. Exp. Med.* 158(2):129-151, 1972.

4975 MICROSCOPIC PICTURE OF PANETH CELLS IN TERMINAL STARVATION IN ALBINO MICE. *(Rus.)* Chanturishvilli, T. P. (Tbilisi State Med. Inst., USSR). *Soobshch. Akad. Nauk Gruz. SSR* 67(2):477-479, 1972.

See also, 5057, 5061, 5071, 5074, 5097, 5119, 5449.

ABSORPTION—EXCRETION—TRANSPORT

4976 NA-K TRANSPORT IN RAT LIVER SLICES IN HEMORRHAGIC SHOCK. *(E.)* Sayeed, M. M.; Baue, A. E. (Washington Univ. Sch. Med., St. Louis, Mo.). *Am. J. Physiol.* 224(6):1265-1270, 1973.

Na, K, and water transport and oxygen consumption were studied in liver slices from male Holtzman rats in late hemorrhagic shock produced by bleeding from the femoral or subclavian arteries until mean arterial blood pressure was 40 mm Hg. After 90 min incubation at 0.5°C in Krebs-Ringer solution, Na increased and K decreased in slices from both control and shocked animals. Upon rewarming (37°C) Na decreased and K increased in the intracellular water of liver slices from controls but not in slices from animals in shock. Liver slices from controls incubated at 37°C without prior chilling gained Na and lost K initially, but on continued incubation extruded Na and reaccumulated K. Slices from shocked animals treated in this manner could support some Na-K transport, but it was markedly decreased. A 2-fold increase in fresh tissue Na with shock was accompanied by a 10% decrease in K and a 20% increase in water content. Liver-slice oxygen consumption was decreased by 50% in shock. Ouabain (1 mM) decreased oxygen consumption by slices from controls but not from shocked animals. These data indicate that energy-linked Na-K transport in hepatic cells is impaired in late hemorrhagic shock.

4977 A COMPARISON OF THE RATE OF ABSORPTION OF MICELLAR AND NONMICELLAR OLEIC ACID. A JEJUNAL PERFUSION STUDY IN MAN. *(E.)* Hoffman, N. E.; Hofman, A. F. (Mayo Clin., Rochester, Minn.). *Am. J. Dig. Dis.* 18(5):489-492, 1973.

The influence of physical state on the rate of fatty acid absorption was studied in 4 healthy male volunteers (aged 21-24 yr) by a perfusion technique featuring a proximal occlusive balloon. The balloon was located at the ligament of Treitz. The rate of absorption of oleic acid was consistently and markedly greater from a micellar solution in 10 mM sodium taurocholate than from an emulsion in 1% gum acacia. For the micellar perfusate, the rate of fatty acid absorption was greater in the first segment, where mean fatty acid concentration was also higher. These results confirm the theory that micellar solubilization promotes the absorption of long-chain fatty acids. Data from emulsion absorption tests indicate that fatty acid is absorbed differently from differing emulsions and that the degree of fat malabsorption in patients with fat maldigestion may be influenced by the type of emulsion present. In all subjects the rates of absorption in the second segment were low during the nonmicellar perfusion, perhaps because the rate of transfer of fatty acid from the emulsion particles to monomeric solution was slow relative to the rate of flow of the perfusate.

4978 ELECTROLYTE TRANSPORT IN HUMAN ILEUM: EFFECT OF PURIFIED CHOLERA EXOTOXIN. *(E.)* Al-Awqati, Q.; Cameron, J. L.; Greenough, III., W. B. (Johns Hopkins Univ. Sch. Med., Baltimore, Md.) *Am. J. Physiol.* 224(4):818-823, 1973.

Segments of small intestine were taken from 7 patients undergoing colectomy for carcinoma of the right colon. Four pieces of distal ileum from each patient were stripped of serosal, muscular, and submucosal layers and mounted as flat sheets in modified Ussing chambers. Purified cholera toxin was added to the mucosal reservoir of 2 tissues and 2 hr later sodium and chloride isotope unidirectional fluxes were measured under short-circuit conditions in the paired tissues. Normal human ileum absorbed sodium, net Na flux was 2.6 $\mu Eq/cm^2/hr$. Net chloride flux was not detected. Tissues treated with cholera toxin showed decreased net sodium movement 0.6 ± 0.8 ($P < 0.05$ from control). There was significant net chloride secretion, net Cl flux -2.9 ± 0.9 ($P < 0.05$ from control). Addition of 10 mM theophylline to the serosal side of control tissues resulted in the same changes, net Na $- 0.4 \pm 0.7$, net Cl -3.0 ± 0.3.

ese changes were due to reduction of the mucosal-
-serosal Na and Cl fluxes. Short-circuit-
rrent response to theophylline was less in cholera
xin-treated tissues, 21 ± 2 μa as compared to
ntrols 80 ± 12 ($P < 0.0005$), while both were
ually responsive to glucose in the mucosal
lution. These results indicate that the *in*
tro effect of purified cholera toxin and theo-
ylline is to inhibit net sodium transport under
ort-circuit conditions. In the absence of
tive sodium transport, the luminal negativity
uld favor sodium secretion. These data show
at theophylline and cholera toxin induce a se-
etory process in the ileum. The induction of
cretion by a mechanism involving cyclic AMP
ggests that this process may be important in
e regulation of intestinal function under phy-
ological conditions.

979 SITE OF INTESTINAL ABSORPTION OF ASCORBIC ACID IN GUINEA PIGS AND RATS.

(E.) Hornig,
; Weber, F.; Wiss, O. (F. Hoffman-La Roche & Co.,
sel, Switzerland). *Biochem. Biophys. Res. Commun.*
(1):168-172, 1973.

e site of absorption of ascorbic acid by the
all intestine was studied *in vivo* in guinea pigs,
rmal and hypophysectomized rats after application
^{14}C-ascorbic acid (2 g/kg of diet, p.o.). A
ecies-specific difference was revealed. The
te of absorption in the guinea pig was located
the duodenal and proximal small intestinal wall,
ereas the rat showed highest absorption in the
eum. Hypophysectomy in rats caused a shift of
e absorption site from the ileum to the jejunum.
absorption was observed in the duodenum and
eum. It is suggested that the pituitary gland
gulates the absorption of ascorbic acid by the
all intestine so that an active transport mechan-
m, similar to that in the guinea pig, is de-
essed to such an extent that only diffusion will
important. Hypophysectomy would then trigger
e active mechanism.

80 INFLUENCE OF CHOLECALCIFEROL (VITAMIN D_3) ON THE INITIAL KINETICS OF THE TAKE OF CALCIUM BY RAT SMALL-INTESTINAL MUCOSA.

.) O'Donnell, J. M.; Smith, M. W. (Agricultural
s. Council Inst. Animal Physiology, Cambridge,
gland). *Biochem. J.* 134(2):667-669, 1973.

ster hooded weanling rats maintained on a rachito-
ic diet for 3 weeks showed evidence of mild rick-
s as determined by the feathered appearance of the
iphysis. Repletion of vitamin D-deficient rats
th cholecalciferol (50,000 IU in 0.05 ml peanut oil
.) had no appreciable effect on spaces available
inulin nor on permeability of the intestine to
lourea. Administration of the vitamin did not
ange 1 min uptake values for 1 mM Ca^{2+} or theoreti-
l values for immediate binding of Ca^{2+} to the sur-
e coat of the intestinal mucosa which were calcu-
ted from intercepts of regression lines. Chole-
lciferol treatment significantly increased the sub-
uent, linear uptake of Ca^{2+} occurring between 3
and 5 min. The 3 min values for vitamin D-deficient and -repleted rats were 6.69 and 9.31 nmol/cm^2, resp and the 5 min values were 9.99 and 13.94 nmol/cm^2, resp. When 1 min Ca^{2+} uptakes were measured with media containing 0.04 to 9 mM Ca^{2+} in small intestine from vitamin D-deficient and -repleted rats, uptakes increased as the external Ca^{2+} concentrations increased, but there was no significant difference between Ca^{2+} uptakes in deficient and repleted rats. No obvious saturation of uptake occurred over this concentration range. It is suggested that the site of vitamin D-mediated action is adjacent to the microvillar membrane.

4981 SOME COMMENTS ON THE COUPLING BETWEEN INTESTINAL ABSORPTION OF GLUCOSE AND OF SODIUM.

(E.) Forster, H.; Matthaus, H. (Inst. Vegetative Physiol., Frakfurt Univ., W. Germany) *FEBS Lett.* 31(1):75-79, 1973.

A jejunal segment 10 cm in length without blood supply was used for perfusion studies in male Sprague-Dawley rats. Glucose absorption occurred in the absence of sodium from the mucosal solution. At various sodium concentrations, no significant differences were seen in the first 10 min of the experiment. When part of the sodium chloride on the mucosal side was replaced with iso-osmolar xylitol, a relative decrease in glucose absorption was exhibited. Part of the glucose was metabolized by the mucosa and the metabolites diffused back to the mucosal solution. On substitution of potassium chloride for sodium chloride, glucose uptake ceased within 5 min and potassium poisoning of the cells occurred. Metabolism also ceased. Increasing glucose concentration, and thus increasing glucose uptake, caused a decrease in sodium excretion into the sodium-free incubation medium. A similar occurrence with fructose, but not with 3-*O*-methylglucose and galactose, indicated that inhibition of sodium excretion by fructose and glucose is related to metabolism of the epithelial cells and not to the active transport of glucose or other sugars.

4982 EFFECT OF PROSTAGLANDIN E_1 ON GLUCOSE, WATER, AND ELECTROLYTE ABSORPTION IN THE HUMAN JEJUNUM.

(E.) Matuchansky, C.; Bernier, J. (St-Lazare Hosp., Paris, France). *Gastroenterology* 64(6):1111-1118, 1973.

The effect of prostaglandin E_1 (0.9 μg/kg/min, intrajejunally), on jejunal absorption of glucose, water, and electrolytes was studied in 9 healthy male volunteers (aged 25-51 yr), using an intestinal perfusion technique with a proximal occluding balloon. A 130 mM Na-30 mM glucose solution and a 130 mM Na-30 mM mannitol solution were perfused (10 ml/min). Prostaglandin E_1 reversed net absorption of water and electrolytes into a profuse net secretion toward the lumen. Glucose absorption was reduced by an average of 25%. Unidirectional flux rate of water and sodium from blood to lumen was strikingly increased whereas the reverse flux decreased. Replacement of mannitol by glucose in the perfusion solution resulted in a significant decrease in prostaglandin E_1-induced net water and sodium secretion. The rate of glucose-stimulated water and sodium transport during prostaglandin E_1 infusion was, however, slower than during control studies; this was due both to the decreased glucose absorption rate and to a decreased rate of sodium transport/micromole of glucose absorbed. In 5 additional subjects perfused with glucose solution (triple-lumen technique), prostaglandin E_1 did not decrease jejunal transit time of intraluminal fluid. It is felt that the luminal loss of fluid caused by prostaglandin E_1 is due to a direct effect on the mucosa. The suggestion that prostaglandins and cholera exotoxin may act on a single intestinal secretory mechanism is strengthened by these results indicating that they are similar in their effect on intestinal transport of water and electrolytes.

4983 IN VITRO TECHNIQUE FOR INTESTINAL ABSORPTION OF TRACE ELEMENTS. *(Ger.)* Schwarz, F. J.; Kirchgessner, M. (Inst. Anim. Nutr., Techn. Univ. Munich, Freising-Weihenstephan, Germany). *Int. J. Vitam. Nutr. Res.* 42(3):497-504, 1972.

Measurements of Cu absorption were made on non-everted jejunal sacs, 20 or 25 cm long, from male Sprague-Dawley rats. Sacs, containing 10^{-3} to 10^{-4} M $CuSO_4$, were incubated in Tyrode solution (serosal solution) for 5-120 min. To minimize cell damage, it is best not to incubate the sacs for more than 60 min. When 25-cm sacs were incubated for 30 min, increases in the Cu concentration of the mucosal solution increased the absorption of Cu into the serosal solution. However, if the total Cu concentration of the serosal solution was expressed as a percentage of the Cu concentration in the mucosal solution, the percentage of Cu absorbed progressively decreased. When only water was placed in the sacs, a very small amount of Cu was detected in the serosal fluid. Addition of physiological saline, 0.1% glucose, or both to mucosal Cu solutions had no appreciable effect on Cu absorption into the serosal solution.

4984 ON THE UPTAKE OF MATERIALS BY THE INTACT LIVER. THE CONCENTRATIVE TRANSPORT OF RUBIDIUM-86. *(E.)* Goresky, C. A.; Bach, G. G.; Nadeau, B. E. (McGill Univ. Med. Clin., Montreal, Quebec, Canada). *J. Clin. Invest.* 52(5):975-990, 1973.

The multiple indicator dilution technique was used to outline the kinetic mechanisms underlying the uptake of rubidium, a cation which in the steady state is concentrated by hepatic parenchymal cells. A mixture of ^{51}Cr-labeled RBC (A vascular reference substance), ^{22}Na (which is confined to the extracellular space, the expected extravascular distribution space for rubidium, in the absence of cellular uptake), and ^{86}Rb was injected into the portal vein and normalized outflow patterns, expressed as outflowing fractions of each injected mass per milliliter *vs* time were obtained. The labeled RBC curve rises to the highest and earliest peak and decays rapidly. That for labeled sodium rises to a later and lower peak, and decays less rapidly. Its extra-polated recovery is equal to that for the red cells. The observed ^{86}Rb curve consists of 2 parts: an early clearly defined peak of reduced area, related to the ^{22}Na peak in timing; and a later tailing, obscured by recirculation, so that total outflow recovery cannot be defined (even though it would be expected to be the same). A model of the concentrative uptake of ^{86}Rb has 2 corresponding outflow fractions: throughput material, which sweeps past the cell surface as a wave delayed with respect to the vascular reference (tracer which has not entered cells); and exchanging material (tracer which has entered cells and later returns to the circulation). The outflow form of the rubidium curve, the presence of both a relatively clearly defined throughput component and a relatively prolonged low-in-magnitude tailing, is consequent to the concentrative character of the transport mechanism, to the presence of an influx rate constant many times the efflux rate constant. The modeling is general and has potential application in situations where transport is nonconcentrative.

4985 ON THE UPTAKE OF MATERIALS BY THE INTACT LIVER. THE TRANSPORT AND NET REMOVAL OF GALACTOSE. *(E.)* Goresky, C. A.; Bach, G. G.; Nadeau, B. E. (McGill Univ. Med. Clin., Montreal, Quebec, Canada). *J. Clin. Invest.* 52(5):991-1009, 1973.

The kinetic relations between the hepatic cell entry process and the metabolic sequestration process were studied by the multiple indicator dilution technique. Labeled RBC (a vascular indicator), labeled sucrose (an extracellular reference), and labeled galactose were rapidly injected into the portal vein, and from rapidly sampled hepatic venous blood, normalized outflow-time patterns were secured. The labeled RBC curve rises to the highest and earliest peak, and decays rapidly; and that for labeled sucrose rises to a later and lower peak. Its extrapolated recovery is equivalent to that of the labeled RBC. At low blood galactose concentrations, the labeled galactose appears at the outflow with labeled sucrose, but is much reduced in magnitude, and exhibits a long tailing. Its outflow recovery is much reduced. At high blood galactose concentrations, the initial part of the profile increases toward that for labeled sucrose, the tailing becomes much larger in magnitude, and the outflow recovery becomes virtually complete. The outflow pattern predicted by a mathematical model of galactose uptake has 2 parts, corresponding to experimental observations: throughput material, which sweeps past the cell surface in the extracellular space; and returning material, which has entered the cells but escaped the sequestration process. Data analysis by this model provides estimates of both transmembrane fluxes and rates of sequestration. The capacity of the process subserving cell entry is 40 times that for phosphorylaon; and, whereas the K_m value for sequestration is s than 15 mg/100 ml, that for entry is approximate- 500 mg/100 ml. Both processes are relatively reospecific: the entry of the L-stereoisomer very slow and it undergoes no significant amount metabolic sequestration. The sequestration pro- s produces a lobular intracellular concentration dient; and this gradient, in turn, produces e uncertainty in the estimate of the true K_m lue for the sequestration process.

986 EFFECT OF GLYCINE-CONJUGATED BILE ACIDS WITH AND WITHOUT LECITHIN ON WATER AND JCOSE ABSORPTION IN PERFUSED HUMAN JEJUNUM.

.) Wingate, D. L.; Phillips, S. F.; Hofmann, F. (Mayo Clin., Rochester, Minn.). *J. Clin. est.* 52(5):1230-1236, 1973.

rfusion studies were performed in healthy vol- teers to test whether the secretory effect of jugated bile acids, previously shown for the lon, was also present in the jejunum. A per- ion system with a proximal occulsive balloon d continuous aspiration of duodenal secretions) used; isotonic test solutions contained gly- e-conjugated bile acids with or without leci- n. Fluid movement was measured by changes in concentration of polyethylene glycol (molecu- wt 4000). Conjugated dihydroxy bile acids ibited electrolyte and fluid absorption and, higher concentrations, evoked secretion of an tonic fluid. Glucose absorption continued, pite fluid secretion, but its rate descreased m 85% to 50%. Decreased glucose absorption was due to a lowering of luminal glucose concentra- n by secreted fluid, since effluent glucose con- trations were always higher when glucose ab- ption was decreased. The secretory effects of e acids were abolished by the addition of 2.5 mM ithin to the bile acid solutions. A trihydroxy e acid (cholylglycine) had no effect on jejunal orption even at 10 mM. Small amounts (6-9%) conjugated bile acids were absrobed in the je- um; lecithin was well absorbed (72-90%). The ults indicate that dihydroxy bile acids influence t and water transport in the human jejunum but t this effect may be abolished when a polar id such as lecithin is present. This effect of e acids may modify fluid movement in the small estine postprandially after fat absorption has urred.

7 THE EFFECT OF PANCREATECTOMY AND OTHER AGENTS ON IRON ABSORPTION AND STORAGE IN RAT.

(E.) Sinniah, R.; Bell, T. K.; Neill, . (Dept. Pathol., Queen's Univ., Belfast, N. land). *J. Clin. Pathol.* 26:130-137, 1973.

eased radioiron (^{59}Fe) absorption was observed oth male and female Wistar albino rats after reatectomy. This appeared to be due to the opera- procedure, as there was a similar increased ab- tion in animals who had sham operations. Pan- tic enzymes or extract in doses of 0.05 g had no ific inhibitory effect on the absorption of iron. With 0.10 to 0.25 g of pancreatic extract, the amount of radioiron absorption was greatly enhanced. A significant increase in hepatic storage iron was found in rats who had been fed a diet supplemented with 0.5% dl-ethionine. These animals showed extensive damage and atrophy of the pancreas with degeneration and considerable regenerative activity in the liver. The absolute increased hepatic storage iron was not due to the liberation and laying down of hemosiderin from the damaged cells or to decreased liver mass. Rats who had carbon tetrachloride-induced liver cirrhosis without pancreatic damage showed no increased hepatic storage iron. In liver damage with considerable cellular proliferation, there was increased liver iron content. As this was found only when there was associated pancreatic injury, it is suggested that decreased pancreatic function in the presence of liver cell injury with cellular proliferation leads to increased iron absorption and storage. The relation of liver injury with cellular proliferation and pancreatic damage to increased hepatic storage iron deserves further study.

4988 ABSORPTION AND SECRETION OF FATTY ACIDS AND BILE ACIDS IN THE INTESTINE OF THE LAYING FOWL.

(E.) Hurwitz, S.; Bar, A.; Katz, M.; Sklan, D.; Budowski, P. (Inst. Animal Sci., Bet Dagan, Israel). *J. Nutr.* 103:543-547, 1973.

Absorption of individual fatty acids and bile acids was assessed in the laying hen through the use of ^{91}Y as a reference substance and microdeterminations of these compounds. A heavy secretion of lipid material containing mainly linoleic, palmitic, and stearic acids occurred in the duodenum. Absorption occurred throughout the entire intestine but the rate in the jejunum was greater than in the ileum. The overall absorption of the individual fatty acids was 82-94%. Dihydroxycholanic bile acids were secreted into the duodenum at a rate of about 8 g/day. Close to 93% of the secreted bile acids was absorbed by both jejunum and ileum. The concentration of these bile acids reached 70 mmoles/liter in the contents of the upper jejunum. These results indicate that bile salt is absorbed at approximately similar rates in the jejunum and ileum. The dihydroxycholanic acids were the major component in chicken bile. However, compared with bile juice, relatively less of the trihydroxycholanic acids was found in the intestinal contents. It is suggested that this might result from a rapid absorption of the trihydroxycholanic acids at the site of secretion. The surprising fact that most of the bile was secreted into the duodenum in a direction counter to the general flow of the digesta is explained by the suggestion that coordinated pulsations of bile flow and pyloric opening are responsible.

4989 INTESTINAL ABSORPTION OF PHOSPHATE IN THE CHICK: EFFECT OF VITAMIN D_3 AND OTHER PARAMETERS.

(E.) Wasserman, R. H.; Taylor, A. N.

(Dept. Phys. Biol., NY State Vet. Coll., Ithaca, N. Y.). *J. Nutr.* 103:586-599, 1973.

The effect of various parameters, including vitamin D$_3$, on the intestinal absorption of ^{32}P-phosphate in the chick was investigated. Translocation was determined by the *in situ* ligated loop technique and measurements were made of radionuclide leaving the intestinal lumen, accumulation by scraped mucosa, and that entering the blood. ^{32}P was rapidly translocated across all segments of the small intestine and vitamin D$_3$ positively affected the total process in each segment. Because of the ease of showing a responsiveness to vitamin D$_3$ by the ileum, this segment was used for further experimentation. In a time course experiment, ^{32}P accumulation by mucosa proceeded more rapidly than the release of radionuclide to blood, indicating that the latter was the limiting step. The absorptive process was saturable as shown by a study in which increasing levels of stable phosphate were present in the absorption fluid. An effect of vitamin D$_3$ on the transfer of ^{32}P from mucosa to body was evident, as well as an effect on the uptake phase. Arsenate, sodium ethane-1-hydroxy-1,1-diphosphonate and L-phenylalanine inhibited ^{32}P translocation, but primarily in the vitamin D$_3$-repleted chicks. This suggested, as did the study of the effect of various levels of stable phosphate, that ^{32}P interacts with some intestinal component in the transport path. Since the sodium salt of ethylene glycol-bis-(β-amino-ethyl ether)-N,N'-tetraacetic acid, and thorough washing of the ileal lumen did not alter ^{32}P absorption and mucosal uptake, it was evident that $^{32}P_1$ was not absorbed as a coion to calcium. A direct relationship between serum calcium levels and the degree of ^{32}P absorption became evident, although this correlation ($r = 0.82$) might be fortuitous. Vitamin D$_3$, when given to rachitic chicks, elicited an enhanced ^{32}P absorption at 16 hr; the appearance of vitamin D-dependent calcium-binding protein was evident at 12 hr. Studies on the nature of ^{32}P in mucosal tissue after absorption indicated that the radionuclide was largely indistinguishable from ortho-phosphate, and that only a small fraction was present as phospholipid-^{32}P. No phosphate binder in mucosal supernatant fluid, analogous to calcium-binding protein, was detected under the specific conditions employed.

4990 1,25-DIHYDROXYCHOLECALCIFEROL: INHIBITION OF ACTION IN ORGAN-CULTURED INTESTINE BY ACTINOMYCIN D AND α-AMANITIN. *(E.)* Corradino, R. A. (NYS Vet. Coll., Cornell Univ., Ithaca, N.Y.). *Nature* 243(5401):41-43, 1973.

When duodena from four 20-day-old chick embryos were cultured in the presence of 0.65 nM 1,25-dihydroxycholecalciferol (1,25-diOH-CC) and 5 mM calcium, calcium-binding protein was induced and radiocalcium uptake was enhanced. Addition of actinomycin D (1.6 µM) to the culture medium completely inhibited calcium-binding protein synthesis and prevented 1,25-diOH-CC enhanced uptake of radiocalcium. This was not the result of nonspecific toxicity as total protein concentration of the mucosa was not reduced and mucosal structure remained intact. Addition of alpha amanitin (0.5 µM) to the culture medium also inhibited 1,25-diOH-CC induction of calcium-binding protein and stimulation of radiocalcium uptake. These results indicate that 1,25-diOH-CC, like vitamin D$_3$, acts on the intestinal calcium absorptive mechanism by stimulation of RNA and subsequent protein synthesis.

4991 PERIODIC HYPOKALAEMIC PARALYSIS, ADRENAL ADENOMA, AND NORMAL COLONIC TRANSPORT OF SODIUM AND POTASSIUM. *(E.)* Richards, P.; Jones, M. B. S.; Peart, W. S. (St. Mary's Hosp. Med. Sch., London, England). *Gut* 14(6):478-484, 1973.

4992 SUGAR AND ELECTROLYTE ABSORPTION IN THE RAT INTESTINE PERFUSED "IN VIVO". *(E.)* Esposito, G.; Faelli, A.; Capraro, V. (Inst. Gen. Physiology, U. Milan, italy). *Pfluegers Arch.* 340(4) 335-348, 1973.

4993 EFFECT OF PHENOBARBITOL ON IODIPAMIDE BILE EXCRETION. *(E.)* Nelson, J. A.; Pepper, H. W.; Goldberg, H. I.; Moss, A. A.; Amberg, J. R. (VA Hosp., San Francisco, Calif.). *Invest. Radiol.* 8(3): 126-130, 1973.

4994 ELECTRICAL PROPERTIES OF ISOLATED HUMAN GALLBLADDER. *(E.)* Rose, R. C.; Gelarden, R. T.; Nahrwold, D. L. (Coll. Med., Pennsylvania State Univ., Hershey). *Am. J. Physiol.* 224(6):1320-1326, 1973.

4995 EFFECT OF BOUND GOSSYPOL ON THE ABSORPTION OF IRON BY RATS. *(E.)* Herman, D. L.; Smith, F. H. (Dept. Animal Sci., North Carolina Univ. Raleigh). *J. Nutr.* 103(6):882-889, 1973.

4996 INHIBITION OF THE GASTROINTESTINAL ABSORPTION OF P-AMINOSALICYLATE (PAS) IN RATS AND HUMANS BY DIPHENHYDRAMINE. *(E.)* Lavigne, J.-G.; Marchand, C. (Fac. Med., U. Montreal, Quebec, Canada) *Clin. Pharm. Pharmacol. Ther.* 14(3):404-412, 1973.

4997 ^{99m}Tc-PERTECHNETATE TRANSPORT IN MAN: ABSORPTION AFTER SUBCUTANEOUS AND ORAL ADMINISTRATION; SECRETION INTO SALIVA AND GASTRIC JUICE. *(E.)* Hays, M. T. (VA Hosp., Buffalo, N.Y.). *J. Nucl. Med.* 14(6):331-335, 1973.

4998 INTESTINAL ABSORPTION, INTESTINAL DISTRIBUTION, AND EXCRETION OF [^{14}C]LABELLED HYOSCINE N-BUTYLBROMIDE (BUTYLSCOPOLAMINE) IN THE RAT. *(E.)* Pentikainen, P.; Penttila, A.; Vapaatalo, H.; Hackman, R. (Medica Ltd., Helsinki, Finland). *J. Pharm. Pharmacol.* 25(5):371-375, 1973.

)99 INTESTINAL BARRIER FUNCTION IN HEMORRHAGIC
SHOCK. *(E.)* Rhodes, R. S.; Depalma, R.
; Robinson, A. V. (Case Western Reserve Sch. Med.,
leveland, Ohio). *J. Surg. Res.* 14(4):305-312,
)73.

)00 INTESTINAL CHLORIDE AND BICARBONATE TRANS-
PORT IN NORMAL AND ENTERECTOMIZED RATS.
.) Bury, K. D.; Grayston, P. (Dept. Surg., U.
oronto, Canada). *J. Surg. Res.* 14(4):294-304,
)73.

See also, 5103, 5109.

MOTILITY

)01 SOME PHYSIOLOGICAL CHARACTERISTICS OF THE
ESOPHAGOGASTRIC JUNCTION OF THE OPOSSUM.
.) Christensen, J.; Freeman, B. W.; Miller, J.
. (Univ. Iowa Coll. Med., Iowa City). *Gastro-
nterology* 64(6):1119-1125, 1973.

ilateral cervical vagotomy did not change closure
ension or abolish relaxation with swallowing in the
ower esophageal sphincter of the opossum, studied by
anometry *in vivo*. Field electrical stimulation of
erial transverse muscle strips, 2 mm wide, cut from
zone spanning the opossum esophagogastric junction,
istinguished 3 regions. Muscle distal to the junc-
ion contracted during the stimulus. Muscle at the
unction relaxed during the stimulus. Muscle proxi-
al to the junction contracted after the stimulus.
ransitional responses occurred. All responses were
ensitive to tetrodotoxin. Muscle from the junction
howed a steeper length-tension curve than muscle
rom adjacent regions. A steep length-tension curve
as correlated in space with stimulus-induced relaxa-
ion. Basal tension during stretch to 150% of rest-
ng length was not sensitive to tetrodotoxin (10^{-7}M).
he results indicate that sphincter closure tension
artly is a consequence of local processes in the
egion of the esophagogastric junction. Muscle of
he esophagogastric junction differs from that of
djacent regions in showing a steeper length-tension
urve and nerve mediated stimulus relaxation. These
haracteristics seem to define the sphincter. The
phincter in the opossum is less than 1 cm long.

)02 ELECTRICAL ACTIVITY OF THE INTESTINE OF
MICE WITH HEREDITARY MEGACOLON AND
BSENCE OF ENTERIC GANGLION CELLS. *(E.)* Wood, J.
. (Univ. Kansas Med. Ctr., Kansas City). *Am. J.
ig. Dis.* 18(5):477-488, 1973.

iebald mice with a recessive gene which reduces
he number of ganglion cells of the large intestine
nd produces megacolon similar to Hirschsprung's
isease were studied. Electrical activity of the
small bowel consisted of electrical slow waves and action potentials and showed no difference between the mice with megacolon and their normal siblings. Electrical slow waves and action potentials occurred in the large intestine of both normal and abnormal mice. The principal difference between normal mice and their abnormal siblings was increased incidence of discharge of action potentials associated with uncoordinated phasic contractions superimposed upon tonic contracture of the circular muscle layer of the distal aganglionic segment in the abnormal mouse. The distended colon of the abnormal mouse and the entire length of the normal bowel showed bursts of action potentials which accompanied peristaltic waves of circular muscle contraction. During propulsive motility in the rectum, activation of the circular muscle was preceded by coordinated contraction of the longitudinal muscle only in the normal bowel. The addition of lidocaine (2.5×10^{-5} g/ml) abolished the coordinated bursts of spikes and the peristaltic activity in the large intestine of both normal and abnormal mice. In 9 of 15 preparations from abnormal mice, lidocaine caused a large increase in the discharge of action potentials at the proximal recording site accompanied by a smaller increase at the distal recording site. Symptoms of megacolon can be accounted for by the absence of spontaneously active inhibitory neurons from the enteric plexuses of the distal segment of the large bowel.

5003 EFFECT OF CERULEIN ON THE HUMAN GASTROINTESTINAL TRACT IN VITRO. *(It.)* Bertaccini, G.; Agosti, A.; Mantovani, P.; Impicciatore, M.; Romano, A. (Inst. Pharmacol., Univ. Parma, Italy). *Boll. Soc. Ital. Biol. Sper.* 48(12):322-324, 1972.

The effect of cerulein on motility was studied *in vitro* on muscle fragments from the stomachs, small and large intestines, and gallbladders of patients undergoing surgery for various gastrointestinal disorders. Only tissue which was normal on gross examination was employed. In addition to anesthetic gas administered during surgery, all patients had been given atropine, tranquillizers, and muscle relaxants. Cerulein consistently produced an increase, which was reversible on washing, in the tonus and spontaneous peristalsis of these tissues. Spontaneous peristalsis was inhibited in only 2 fragments of duodenum. As in *in vivo* experiments, the gallbladder was the organ most sensitive to cerulein (threshold dose 0.02-0.2 ng/ml), followed by the stomach and small intestine (threshold dose 0.2-10 ng/ml) and the large intestine (threshold dose 1-50 ng/ml). A dose-effect relation was observed in all but 7 of the 60 tissues studied. Some tissues did not respond at all, even to large doses (100-300 ng/ml) of cerulein, perhaps because of structural disorganization which had occurred in nerves and muscles as a result of the patients' disorders. Atropine (10^{-5} g/ml) and tetrodotoxin (concentration unspecified) reduced the effect of cerulein by about 90%, suggesting that the action mechanism of cerulein is the same in man as in the guinea pig ileum. Bradykinin and physalaemin, both of which act directly on smooth muscle cells, did not inhibit the effect of atropine or tetrodotoxin. Cerulein appears to act directly only on the gallbladder, where no antagonist is effective.

5004 INTESTINAL MOTILITY INCREASED BY TETRADOTOXIN, LIDOCAINE, AND PROCAINE.

(E.) Biber, B.; Fara, J. (Dept. Physiol., Univ. Goteborg, Sweden). *Experentia* 29(5):551-552, 1973.

The extent to which intestinal motility results from myogenic activity and is modified by intrinsic excitatory and inhibitory factors was investigated in 10 cats. A section of the jejunum with its lymph nodes was studied *in situ* in a chamber containing Tyrode solution. Venous outflow was recorded as intraluminal pressure changes *via* an open-tipped saline-filled cannula; both ends of the segment were tied. Drugs were injected into the superior mesenteric artery *via* one of the small branches. After a 1-5 min latent period tetrodotoxin (2-6 μg/kg), lidocaine (10-20 mg/kg), and procaine (10-20 mg/kg) consistently increased rhythmic intestinal motility for as long as 30 min, depending on drug dosage. The motility increase was independent of the degree of spontaneous activity present before drug injection. Atropine (0.2-0.5 mg/kg) did not increase motility or alter the effects of the other 3 drugs. These drugs did not affect arterial pressure. The motility increase may result from the nerve-blocking action of tetrodotoxin, lidocaine, and procaine; this eliminates the local neurogenic inhibitory action which normally suppresses myogenic activity. Since the intestine is exposed to continuous and variable inhibition by local neurogenic or neurohormonal mechanisms, what appears as stimulated intestinal motility may really be a release from intrinsic inhibition.

5005 THE HORMONAL REGULATION OF PYLORIC SPHINCTER FUNCTION.

(E.) Fisher, R. S.; Lipshutz, W.; Cohen, S. (Univ. Pennsylvania Hosp., Philadelphia). *J. Clin. Invest.* 52(5):1289-1296, 1973.

Studies were performed on both pyloric circular muscle, *in vitro* (using 12 adult opossums), and the human pylorus, *in vivo* (using 8 men and 2 women, aged 21-54 yr). Full dose-response curves to gastrin I, cholecystokinin, and secretin were constructed for the pyloric muscle of the opossum studied at its length of optimal tension development, Lo. Both cholecystokinin and secretin were potent agonists on the muscle, but gastrin I gave no increase in muscle tension. The combination of cholecystokinin and secretin was additive at submaximal concentrations but potentiation of maximal responses was not observed. Gastrin I produced a surmountable, competitive-like antagonism to the effect of cholecystokinin on the pyloric muscle. The octapeptide of cholecystokinin was a more potent agonist than the whole molecule of cholecystokinin on the pyloric muscle. In man, the pyloric pressure rose significantly during i.v. infusion of cholecystokinin or secretin. The combination of maximal doses of both hormones did not show significant potentiation. Gastrin I did not significantly increase pyloric pressure but did antagonize the pyloric response to duodenal acidification. These studies suggest that both secretin and cholecystokinin augment pyloric sphincter pressure while gastrin I is an antagonist inhibiting their effects. It is also suggested that the hormonal responses of pyloric sphincter circular muscle, *in vitro*, can be correlated with human sphincter function, *in vivo*.

5006 EFFECTS OF INCREASED DIETARY FIBRE ON INTESTINAL TRANSIT.

(E.) Harvey, R. F.; Pomare, E. W.; Heaton, K. W. (Bristol Roy. Infirm., England). *Lancet* (7815):1278-1280, 1973.

Intestinal-transit time was measured once in 20 subjects eating their usual diet (in each case a refined diet with a relatively low content of plant fiber), and again after at least 4 weeks on either a high-fiber diet containing wholemeal bread or their usual diet supplemented with unprocessed bran (about 30 g/day). Of the 20 subjects, 4 were healthy volunteers, 6 had undergone cholecystectomy for gallstones at least 6 months earlier, and 10 were outpatients with constipation or the irritable-bowel syndrome. At the time of this study, 12 had symptoms of constipation or diarrhea. Subjects whose transit was initially slow demonstrated a significant decrease in transit-time on this regimen (mean decrease from 3.8 to 2.4 days, $P < 0.0025$). In contrast, those with rapid transit demonstrated an increase in transit-time (mean increase from 1.0 to 1.72 days, $P < 0.005$). These findings suggest that increasing the dietary fiber content may be beneficial in some patients with nonspecific diarrhea, as well as in those who have constipation. They are also compatible with the concept of an "irritated" bowel syndrome.

7 GLUCAGON AND GASTROINTESTINAL MOTILITY IN RELATION TO THYROID-PARATHYROID FUNCTION.
) Johansson, H.; Segerstrom, A. (Univ. Hosp.,
sala, Sweden). *Upsala J. Med. Sci.* 77(3):
-188, 1972.

trointestinal propulsive motility was studied
er intragastric deposition of a nonabsorbable
tope in 23 male albino Sprague-Dawley rats
ected s.c. with 1.2, 4.8, or 9.6 mg/kg glucagon.
athyroidectomies and thyroparathyroidectomies
e performed on 17 and 48 additional rats, resp.
cagon administration was followed by retardation
gastric emptying, independent of the presence of
h thyroid and parathyroid tissue. In intact
s, 4.8 and 9.6 mg/kg glucagon produced signi-
ant hypocalcemia. The hypocalcemic effect of
cagon was independent of the presence of
roid tissue, i.e., thyrocalcitonin. When
athyroidectomy was combined with simultaneous
roidectomy, the glucagon effect was dependent
the degree of parathyroid function. The retard-
effect of glucagon was noted 45 min after
inistration but disappeared by 90 min, indica-
g that glucagon action has a short duration.
hough glucagon retards gastrointestinal
pulsion with or without the presence of thyroid
parathyroid tissue, this does not exclude a
ation between pancreatic and thyro-parathryoid
ction.

8 EFFECT OF CHEMICAL RESTRAINT DRUGS ON THE PASSAGE OF BARIUM SULFATE THROUGH THE
MACH AND DUODENUM OF DOGS. *(E.)* Zontine, W. J.
iv. California, Los Angeles, Sch. Med.). *J. Am.*
. Med. Assoc. 162(10):878-884, 1973.

5009 A DOUBLE ISOTOPE TECHNIQUE FOR THE EVALUATION OF DRUG ACTION ON GASTRIC EVACUATION AND SMALL BOWEL PROPULSION STUDIED IN THE RAT. *(E.)* Nilsson, F.; Johansson, H. (Dept. Surg., Univ. Hosp. Uppsala, Sweden). *Gut* 14(6):475-477, 1973.

5010 AFFERENT ACTIVITY OF THE GASTRIC BRANCHES OF THE VAGUS NERVE DURING THE ACT OF EATING. *(Rus.)* Nozdrachev, A. D.; Chubarova, N. I. (I. P. Pavlov Inst. Physiol., Leningrad, USSR). *Dokl. Akad. Nauk SSSR* 207(2):497-500, 1972.

5011 THE RELAXING EFFECT OF ALUMINUM AND LANTHANUM ON RAT AND HUMAN GASTRIC SMOOTH MUSCLE IN VITRO. *(E.)* Hava, M.; Hurwitz, A. (Univ. Kansas Med. Ctr., Kansas City). *Eur. J. Pharmacol.* 22:156-161, 1973.

5012 MYOGENIC PERISTALSIS IN ISOLATED PREPARATIONS OF CHICKEN OESOPHAGUS. *(E.)* Bartlet, A. L. (Roy. (Dick) Sch. Vet. Studies, Edinburgh, Scotland). *Br. J. Pharmacol.* 48(1): 36-47, 1973.

See also, 4964, 5034.

SECRETION AND METABOLISM

13 EFFECT OF EXERCISE ON GASTROINTESTINAL SECRETIONS. *(E.)* Konturek, S. J.; Tasler,
Obtulowicz, W. (Med. Acad. Cracow, Poland).
Appl. Physiol. 34(3):324-328, 1973.

effect of exercise on gastric pancreatic, and
atic exocrine secretion was assessed in 15 con-
ous dogs prepared with gastric, pancreactic, and
iary fistulas and with either vagally innervated
vagally denervated pouches. Animals were
rcised on a treadmill by running at a rate
10 km/hr for a 15 min period. Exercise caused
udden decrease of pouch response to a meat meal
to pentagastrin and a fall in gastric mucosal
od flow determined by aminopyrine clearance
hnique. In the pancreas, exercise depressed
secretion of both fluid and bicarbonate stimulated by meat meal, secretin, and intraduodenal instillation of acid. Exercise did not alter food-induced biliary secretion of volume and bicarbonate. These findings suggest that exercise causes inhibition of gastric acid and pancreatic bicarbonate secretion. The inhibitory mechanism seems to involve primary vascular inhibition of gastric mucosal blood flow. The finding that exercise was a less effective inhibitor of pancreatic bicarbonate secretion when secretin was stimulated by duodenal acidification in comparison with exogenous secretin or feeding is explained by the fact that acidification may release more than one pancreatic stimulant. During the highly acidic duodenal infusion, small amounts of cholecystokinin are released and potentiate the action of secretin on pancreatic bicarbonate secretion. The lack of any change in protein output

during exercise may indicate that exercise does not inhibit cholecystokinin-stimulated pancreatic enzyme secretion.

See also, 4956.

SECRETION AND METABOLISM

Stomach

5014 CENTRAL ANTISECRETORY ACTION OF DESMETHYLIMIPRAMINE IN THE RAT. *(E.)* Ridley, P. T.; Mann, W. A. (Smith Kline French Lab., Philadelphia, Pa.) *Am. J. Dig. Dis.* 18(5):493-497, 1973.

Gastric acid secretion was studied in male Charles River rats following intracerebroventricular or i.v. administration of desmethylimipramine hydrochloride, imipramine hydrochloride, chlorpromazine hydrochloride, or morphine sulfate, all of which are suspected of possessing an ability to inhibit secretion by influencing the central nervous system. Desmethylimipramine inhibited acid secretion at significantly lower doses when given intracerebroventricularly (0.04-0.16 mg/kg) rather than i.v. (0.05-5.0 mg/kg). Morphine sulfate suppressed acid output at intracerebroventricular doses between 0.025-1.0 mg/kg and i.v. doses between 2.0-8.0 mg/kg. The data suggest that desmethylimipramine, and morphine sulfate exert their inhibitory effect by acting on the central nervous system, and that this may account for the inhibition of gastric acid secretion seen with these agents. The difference in effectiveness of the 2 routes of administration was not significant for imipramine or chlorpromazine. However, it is stressed that imipramine did suppress gastric acid volume, acidity, and output when administered by the intracerebroventricular route, contrary to other reports. It is remarkable that the demethylated compound is so much more active than imipramine when given by the intracerebroventricular route, while the i.v. dose-response curves for these 2 compounds are similar.

5015 COMPARISON OF PENTAGASTRIN AND AUGMENTED HISTAMINE STIMULATION AS TESTS OF GASTRIC ACID SECRETION. *(E.)* Khodadoost, J.; Leitao, O.; Glass, G. B. J. (New York Med. Coll., N.Y.). *Am. J. Gastroenterol.* 57(4):311-317, 1972.

The effects of pentagastrin and augmented histamine stimulation were evaluated on 20 patients (12 men and 8 women; aged 21-26 yr) with various gastrointestinal disorders: duodenal ulcer (4), functional gastrointestinal disorders with a normal upper gastrointestinal series (10), atrophic gastritis as proven by gastric suction biopsy (3), and miscellaneous disorders (3). Gastric aspirations were divided into 50-min aliquots and were collected for the duration of 30 min prior to and after stimulation by pentagastrin (6 μg/kg) or histamine phosphate (0.04 mg/kg). Gastroscopy was performed in 7 patients, using the semiflexible gastroscope, within 48 hr following pentagastrin stimulation and the appearance of the gastric mucosa was evaluated. The acid output during the first hr was larger after histamine than after pentagastrin in 9 individuals, while in 8 others, it was larger after pentagastrin than after histamine, and in 3 cases acid output was identical after each. Thus, the effect of pentagastrin and histamine stimulation on gastric acid secretion is similar in the first hr after stimulation. The acid output during the second was significantly higher after histamine than after pentagastrin, especially between 90-120 min after stimulation. The duration of the stimulatory effect of pentagastrin on gastric acid secretion was shorter than that of the augmented histamine stimulus, which may be considered an advantage. In none of these patients was any significant side effect observed, nor changes in the pulse rate or blood pressure noted. Mild sweating and dizziness occurred in 2 patients, 5 had mild headache, and about half had a very mild epigastric discomfort of short duration following pentagastrin administration. The occurrence of a few asymptomatic scattered gastric erosions in the gastric mucosa after pentagastrin (29%) was less frequent than after augmented histamine test.

5016 ACTIONS AND INTERACTIONS OF GUT HORMONES AND HISTAMINE ON GASTRIC SECRETION OF ACID IN THE RAT. *(E.)* Chey, W. Y.; Sivasomboon, B.; Hendricks, J. (Genesce Hosp., Rochester, N.Y. *Am. J. Physiol.* 224(4):852-856, 1973.

Gastric acid secretory studies were performed in conscious Sprague-Dawley rats prepared with a gastric cannula 0.5 cm in inner diameter. The peak acid secretory response could be obtained by continuous i.v. administration of pentagastrin (1 μg/kg/hr) or histamine acid phosphate (160 μg/kg/hr). C-terminal octapeptide of cholecystokinin was also a potent stimulant of acid secretion; the maximal acid output stimulated by 0.24 μg/kg/hr was similar to that produced by pentagastrin or histamine peak dosage. Similar observations were made with natural cholecystokinin. Synthetic secretin at 1.32 and 0.66 μg/kg/hr, resp., resulted in profound inhibition of spontaneous gastric acid secretion and ecretion stimulated by maximally effective doses f pentagastrin, octapeptide, and histamine. The holecystokinin octapeptide had no influence on cid secretion stimulated by pentagastrin or histaine. The present studies indicate that secretin s a potent enterogastrone in rat, while cholecystoinin is a potent gastric stimulant. The results lso indicate that species differences exist in the iological actions of secretin and cholecystokinin n gastric acid secretion.

017 DEMONSTRATION OF A BARIUM-POTASSIUM ANTAGONISM ON LUMEN SIDE OF IN VITRO FROG STOMACH. E.) Sanders, S. S.; Noyes, D. H.; Spangler, S. G.; ehm, W. S. (Med. Ctr., Univ. Alabama, Birmingham). *m. J. Physiol.* 224(6):1254-1259, 1973.

rog gastric mucosa of *Rana pipiens* were mounted etween Lucite chambers with the appropriate elecrodes and the effect of the addition of Ba^{++} to the athing media was determined on the potential diference, electrical resistance, and the H^+ secretory ate. With 4 mM K^+ on the secretory side and 0 K^+ n the nutrient side, the addition of Ba^{++} (2.0 mM) o the secretory side produced a marked decrease n the H^+ secretory rate. This inhibition of the H^+ rate was reversed either by restoration of K^+ to he nutrient side or by an increase in K^+ concentraion on the secretory side. It is concluded that here is a Ba^{++}-potassium antagonism on the secreory side which has been unmasked by the appropriate anipulation of experimental conditions.

018 EFFECT OF TOPICAL PREDNISOLONE AND ACETIC ACID ON THE ANTRAL PHASE OF GASTRIC SECRETION. *(E.)* Aubrey, D. A.; Burns, G. P. (Univ. losp. Wales, Penarth). *Am. J. Surg.* 125(6):676-80, 1973.

fter preliminary exposure of vagally denervated anine fundic pouches to prednisolone (62.5 mg in 0 ml water), the outputs of H^+ secreted in response o a meat meal were increased from 1.526 to 2.797 Eq/hr after 2 hr, whereas the outputs of Na^+ were nchanged. Conversely, after exposure of the pouch o acetic acid (100 mM), the outputs of H^+ dropped rom 1.526 to 0.285 mEq/hr, but the outputs of Na^+ ere increased from 0.210 to 0.415 mEq/hr after hr; mucosal hemorrhage did not occur. When the ouches were exposed simultaneously or sequentially o prednisolone and acetic acid, and then stimulated by feeding the animals, exsorption of Na^+ as greater than it was after exposure to acetic cid alone, and mucosal hemorrhage was observed onsistently. Nevertheless, after exposure of he pouches to prednisolone and acetic acid, the eak outputs of H^+ were more increased than they ere after exposure of the pouches to prednisolone lone. The results indicated that the degree of ucosal damage caused by acetic acid was increased y prednisolone. The stimulatory effect of the teroid was enhanced when it was applied to the amaged, abnormally permeable mucosa.

5019 EFFECT OF INTRAVENOUS INFUSION OF SODIUM OLEATE ON CANINE GASTRIC SECRETION, STIMULATED BY HISTAMINE, PENTAGASTRIN AND CHOLINERGIC AGENT BETHANECHOL CHLORIDE. *(E.)* Kowalewski, K.; Secord, D. (Surg.-Med. Res. Inst., Univ. Alberta, Edmonton, Canada). *Arch. Int. Phyisol. Biochim.* 80(4):685-695, 1972.

Purebred Labrador dogs with Heidenhain pouches or antrectomized with Heidenhain pouches were infused for 6 hr with sodium oleate (0.02M at 10 ml/kg/hr, i.v.) in normal saline. During the infusion of oleate, either histamine (0.3 mg/kg, s.c., at 0, 2, and 4 hr during 6 hr infusion), pentagastrin (6 µg/kg, s.c., at similar times), or the cholinergic drug bethanechol chloride (0.2 mg/kg/hr, i.v.) was used as a gastric stimulant. In all dogs, and under all conditions of stimulation, the 6 hr-output of hydrochloric acid was inhibited during the oleate infusion as compared with control animals infused with saline alone. A decrease in pepsin output was noted in some groups. Plasma oleate was not increased after the infusion of oleate for 6 hr. Homeostatic mechanisms must lead to increased turnover and adsorption of the oleate. Oleate was increased in the liver and the fat stores examined, but not in amounts sufficient to account for the total infused oleate. After oleate infusion, cholesterol and total protein concentrations were increased in the liver and decreased in the blood serum. The mechanism of inhibitory action of i.v. oleate on canine gastric secretion is not clear.

5020 POSSIBLE ROLE OF CYCLIC AMP IN GASTRIC ACID SECRETION IN RAT. ACTIVATION OF CARBONIC ANHYDRASE. *(E.)* Narumi, S.; Maki, S. (Biol. Res. Lab., Takeda Chem. Industries, Osaka, Japan). *Biochim. Biophys. Acta* 311(1):90-97, 1973.

Administration of theophylline (200 mg/kg, i.p.) and gastric acid stimulants such as histamine, (1 mg/kg, i.v.) tetragastrin (100 µg/kg, i.v.) and carbachol (100 µg/kg, i.v.) increased the adenosine 3':5'-cycle monophosphate (cyclic AMP) level 2-3-fold in the stomachs of male Sprague-Dawley rats as compared with controls. N^6-2'-O-Dibutyl cyclic AMP (dibutyryl cyclic AMP 25 mg/kg, i.v.) stimulated gastric acid secretion and activity of carbonic anhydrase in rat gastric mucosa. *In vitro* addition of cyclic AMP (10^{-5}-10^{-7} M) to the supernatant fraction (cytosol) of rat gastric mucosa caused a concentration dependent potentiation of carbonic anhydrase activity. It is considered that this activation was mediated through protein kinase activation.

5021 THE EFFECT OF ANTRAL ACIDIFICATION ON ACID SECRETION STIMULATED BY PENTAGASTRIN. *(E.)* Wheeler, M. H.; Prescott, R. J.; Forrest, A. P. M. (Dept. Clin. Surg., Univ. Edinburgh, Scotland). *Br. J. Surg.* 60(3):197-200, 1973.

In 6 dogs with innervated antral pouches (4 with vagally innervated fundic pouches and 2 with vagally denervated fundic pouches), the effect of irrigating the antral pouches with acid on the pentagastrin-induced secretion from the fundic pouches was assessed. Each of 6 doses of pentagastrin (0.25-8.0 μg/kg/hr i.v. for 3 hr) was given in a single test on different days. No consistent inhibition of secretion was observed in either preparation. The results do not support the concept of either an inhibitory hormone or an inhibitory neural reflex of antral origin active against pentagastrin-stimulated acid secretion.

5022 MAXIMAL GASTRIC SECRETION IN PATIENTS WITH CHRONIC AIRWAY OBSTRUCTION.

(E.) Hassan, M. A.; Hobsley, M. (Middlesex Hosp., London, England) *Br. J. Surg.* 60(4):300-303, 1973.

Maximal gastric secretion was studied in 14 subjects with evidence of chronic obstructive chest disease and in 13 normal subjects, using the histamine infusion test with phenol red as a marker to correct for pyloric loss. The 2 groups did not differ significantly in maximal gastric secretion. This conclusion was not altered by taking stature into account because stature was statistically comparable in the 2 groups. Age was significantly different but, correction of the secretory data for the diminution of maximal secretion with age only served to improve the correspondence between the groups. It can be concluded that chronic airway obstruction does not significantly influence maximal gastric secretion. However, there remains the possibility that if basal or submaximal gastric secretion is studied, a significant difference might emerge. It is suggested that failure to take stature and age into account is responsible for conflicting past evidence.

5023 EFFECT OF DIMETHYL SULFOXIDE (DMSO) ON GASTRIC SECRETION IN RATS.

(E.) Bralow, S. P.; Gruenstein, M.; Hitanant, S.; Johnson, W. (Jefferson Med. Coll., Philadelphia, Pa.). *Digestion* 8(2):120-129, 1973.

Gastric secretory studies using a 4 hr pylorus-ligation technique were performed on young male Wistar rats given dimethyl sulfoxide as a solvent for gastric carcinogens. Single intragastric doses of 1 ml 50% dimethyl sulfoxide reduced the 4 hr volume by 48%, titratable acidity by 20%, and acid output by 57.3%. Pepsin was not affected. With 1 ml 100% dimethyl sulfoxide, gastric secretion was mostly mucus and the volume was not changed; titratable acidity decreased by 87.4%, acid output by 91%, and pepsin by 66%. Following 100% dimethyl sulfoxide, 70% of the animals developed hemorrhagic ulcerations. Subcutaneous administration of 1 ml dimethyl sulfoxide (25-100%) inhibited gastric secretion in a linear fashion; volume (r = 0.605) and acid output (r = 0.626). Pepsin was not affected and titratable acidity was not decreased unless dimethyl sulfoxide concentration was greater than 50%. Parenterally administered dimethyl sulfoxide may benefit peptic ulcer patients by inhibiting gastric acid secretion. However, the possible injurious effects of orally administered dimethyl sulfoxide on the human stomach should be further evaluated.

5024 GASTRIC ACID SUPPRESSION BY INTRAVENOUS GLUCOSE SOLUTIONS.

(E.) Moore, J. G. (Univ. Utah Coll. Med., Salt Lake City). *Gastroenterology* 64(6):1106-1110, 1973.

Basal acid collections (24 and 12 hr) were obtained from 15 healthy, young male volunteers (aged 22-27 yr). During collections, subjects were infused either with saline or a 5 or 15% glucose solution. A 5% glucose infusion significantly suppressed basal acid secretion (mean % of suppression = 33.8%) when compared with saline infusion. Plasma glucose levels were significantly higher during glucose infusion when compared with saline infusion. The basis for acid suppression by glucose infusion is not known but may be related to elevated plasma levels or plasma osmolality. It is apparent that i.v. 5% glucose solution constitutes more than simple fluid and caloric replacement therapy. The effect on gastric acid output may have therapeutic application in treatment of the acutely symptomatic peptic ulcer patient and in the postoperative patient after gastric procedures. This effect must also be taken into consideration during routine monitoring of gastric acid secretion in subjects who are receiving i.v. glucose feedings.

5025 EFFECT OF PROPRANOLOL ON PENTAGASTRIN-INDUCED HCl SECRETION AND GASTRIC MUCOSAL BLOOD FLOW IN DOGS.

(E.) Lin, T.; Evans, D. C. (Lilly Res. Lab., Indianapolis, Ind.). *Gastroenterology* 64(6):1126-1129, 1973.

Dogs with Heidenhain pouch and vagally innervated gastric fistula were given continuous i.v. infusion of pentagastrin (1.2 μg/kg/hr) and aminopyrine (5 mg/kg/hr). The steady state volume, acid concentration, and output from the pouch and the fistula were significantly augmented for 1 to 2½ hr by 0.5 mg/kg of propranolol, the β-adrenergic blocker. The mucosal clearance of plasma aminopyrine was increased while the ratio of aminopyrine concentration in the gastric juice to that in the plasma was decreased by propranolol. Propranolol augmented secretion of the Heidenhain pouch more than that of the vagally innervated gastric fistula. Although the augmented gastric response was accompanied by an increased gastric mucosal blood flow, the results suggest that the change in blood flow was not the primary mechanism responsible for the augmentation. The difference between the pouch and the fistula responses to propranolol is explained as follows. The Heidenhain pouch response was restrained by the effects of the adrenergic fibers. The blocking of the β-adrenergic effect to the pouch by propranolol resulted in a release of oxyntic cells from inhibitory action existing as a physiological tonus, an increase in mucosal blood flow, and a decrease in the value of the ratio of aminopyrine concentrations in gastric juice to plasma. However, gastric fistulae receive both sympathetic

d vagal influences from the autonomic system and
ese are in reciprocal balance. Gastric and vagal
tion augment the stimulating action of each other.
ace tonic adrenergic activity is already partly
mterbalanced by tonic cholinergic activity, the
moval of β-adrenergic inhibition with propranolol
s less influence on the response to gastrin in
e fistulae than in the pouch.

6 EFFECT OF GASTRIC ACIDITY ON GASTRIC ULCERA-
TION INDUCED BY HEMORRHAGE IN THE RAT,
LIZING A GASTRIC CHAMBER TECHNIQUE.

(E.) Mer-
eau, W. A.; Hinchey, E. J. (Montreal Gen. Hosp.,
ada). *Gastroenterology* 64(6):1130-1135, 1973.

ex vivo gastric chamber technique is described
ch allows continuous low-powered microscopic
ervation of acute gastric ulcer formation
uced by hemorrhagic shock in the rat. Ulceration
ins, within minutes, as microscopic foci of
osal cell damage. These lesions enlarge during
10 min shock period and bleed when shed blood
reinfused. Ulceration is directly related to
concentration of hydrogen ions in the solution
contact with the gastric mucosa and does not
ur below a hydrogen ion concentration of 25 mEq/
er. These results are confirmed in an intact
preparation. In the totally ischemic mucosa,
eration occurs in the same fashion, but is far
e extensive at high acid concentration. Ulcers
also formed at lower hydrogen ion concentrations
n in the hypotensive group. The development
focal lesions in the completely ischemic mucosa
gests that preexisting focal mucosal defects
her than microcirculatory alterations are the
mary cause of ulcer formation. It is suggested
t mucosal blood flow protects these defects from
eration in the normotensive animal.

7 EFFECT OF NEPHRECTOMY ON THE RATE AND PAT-
TERN OF THE DISAPPEARANCE OF EXOGENOUS GAS-
N IN DOGS.

(E.) Clendinnen, B. G.; Reeder, D. D.;
ndt, E. N., Jr.; Thompson, J. C. (Univ. Texas
. Branch, Galveston). *Gut* 14(6):462-467, 1973.

dies of gastrin metabolism were performed in 4 dogs
ore and after nephrectomy. Synthetic human gastrin
as infused for 2 hr and serum samples were ob-
ned at various times during and after infusion.
um concentrations of gastrin were measured by
ioimmunoassay. A 2 compartment model was em-
yed to calculate half-lives under each of 4
erimental conditions, low and high infusion
es, used both before and after nephrectomy.
model half-life was greatly prolonged after
hrectomy at both infusion rates (from 2.54-
5 min at the low rate, and from 2.85-7.88 min
the high rate). The greater increase in half-
e at the high dose suggests that the limits of
durable mechanisms for the catabolism of gastrin
being approached at the higher infusion rate.
half-life of the initial component was prolonged
m 2.18-3.90 min at the low and from 1.62-7.34
at the high dose, suggesting a slowing of
abolic processes after nephrectomy. The metabolic clearance rate, an expression of the rate of catabolism during infusion, decreased significantly after nephrectomy at both infusion rates. These observations indicate that the kidney is an important organ for the catabolism of exogenous gastrin.

5028 THE GASTRIC SECRETORY RESPONSE TO A CONTINUOUS INSULIN INFUSION IN THE DOG.

(E.) Dozois, R. R.; Carter, D. C.; Kirkpatrick, J. R. (Dept. Clin. Surg., Univ. Edinburgh, Scotland). *Gut* 14(6):468-474, 1973.

The gastric acid response to graded doses of insulin given by continuous infusion was studied in 4 dogs, each surgically provided with a chronic gastric fistula. All doses of insulin resulted in a prolonged plateau of hypoglycemia and the degree of hypoglycemia correlated significantly with the insulin dose, up to 0.15 U/kg/hr. Similarly, graded doses of insulin (up to 0.15 U/kg/hr) produced graded acid responses and both the peak acid output and the total acid output correlated significantly with blood glucose changes. No initial inhibitory phase of acid secretion followed the start of the infusion, but a dose-related delay in the onset of the acid response was observed. Results indicate that insulin provides a quantitative glycopenic stimulus producing a quantitative vagal acid response.

5029 ACTION OF CAERULEIN AND CAERULEIN-LIKE PEPTIDES ON "SHORT-CIRCUIT CURRENT" AND ACID SECRETION IN THE ISOLATED GASTRIC MUCOSA OF AMPHIBIANS.

(E.) Negri, L.; Erspamer, V. (Inst. Med. Pharmacol., Univ. Rome, Italy). *Naunyn Schmiedebergs Arch. Pharmacol.* 277(4):401-412, 1973.

Caerulein produced an increase of the "short-circuit current "(SCC) in the isolated gastric mucosa of *Rana esculenta* and *Bufo viridis*. Threshold concentrations were of the order of 10^{-10} M and 3×10^{-11} M, resp. A dose-response relation was observed for concentrations of the polypeptide up to 10-20 times the threshold. At the same time, the polypeptide increased secretion of the hydrochloric acid by isolated mucosa, as measured by direct titrimetry. The effects of caerulein were atropine-resistant (1-10 μg/ml) and hence not mediated through a cholinergic mechanism. The action of caerulein on SCC was compared with that of a number of synthetic caerulein-like peptides and of other miscellaneous stimulants of gastric acid secretion. With the exception of some caerulein-like peptides, no other compound could compete with caerulein in its stimulant action on the isolated amphibian gastric mucosa: cholecystokinin possess 2-4% of the activity of caerulein, histamine 0.1-0.15%, human gastrin I 0.01-0.02%, pentagastrin 0.01-0.03%, and carbachol 0.015-0.03%. The following conclusions were drawn regarding the relation between chemical structure and biological activity. Sulfation of the tyrosyl residue is a prerequisite for the appearance of the intense action of caerulein-like peptides on the SCC. The lengthening of the tis amino acid chain beyond a certain limit seems to diminish the activity of the polypeptide molecule. The C-terminal heptapeptides of both caerulein and cholecystokinin are 20-40 times more active than the C-terminal hexapeptide of gastrin II. The simultaneous appearance of two sulfated tyrosyl residues in the heptapeptide molecule, one in position 6, the other in 7, cases the molecule to resemble gastrin rather than caerulein. The displacement of sulfated tyrosyl residue to position 5 (always from the terminal C) causes a drastic reduction of activity. The sulfated L-tyrosyl residue at position 7 can be replaced with good or full preservation of activity not only by a sulfated D-tyrosyl residue, but also by a sulfated *p*-hydroxyphenylpropionic residue.

5030 CONTINUOUS RECORDING OF GASTRIC ACID OUTPUT IN THE RAT. *(E.)* Winship, D. H.; Shuck, T. J. (Univ. Missouri Sch. Med., Columbia). *J. Lab. Clin. Med.* 81(6):961-966, 1973.

5031 FACTORS AFFECTING THE GELLING OF GASTRIC MUCUS. *(E.)* Snary, D.; Allen, A.; Pain, R. H. (Dept. Biochem., Univ, Newcastle upon Tyne, England). *Biochem. Soc. Trans.* 1(2):450-452, 1973.

5032 CALCIUM AND GASTRIC SECRETION. *(E.)* Barreras, R. F. (Univ. Wisconsin Med. Ctr., Madison). *Gastroenterology* 64(6):1168-1184, 1973.

5033 CYCLIC 3',5'-ADENOSINE MONOPHOSPHATE IN THE RAT GASTRIC MUCOSA AFTER STARVATION, FEEDING, AND PENTAGASTRIN. *(E.)* Ruoff, H. -J.; Sewing, K. -Fr. (Dept. Pharmacology, Univ. Tübingen, West Germany). *Scand. J. Gastroenterol.* 8(3):241-243, 1973.

5034 RECONSTRUCTIVE JEJUNOGASTROPLASTY AS A METHOD OF STUDY OF THE INTESTINAL PHASE OF GASTRIC SECRETION. *(Rus.)* Berkos, O. V.; Eremeeva, A. F.; Matrosova, E. M.; Samokhvalov, V. I. (I. P. Pavlov Inst. Physiology, U.S.S.R. Acad. Sci., Leningrad). *Biull. Eksp. Biol. Med.* 75(3):121-124, 1973.

5035 STUDIES ON GASTROINTESTINAL HORMONES. X. EFFECTS OF TETRAGASTRIN ON GASTRIC SECRETION AND ISOLATED SMOOTH MUSCLES. *(E.)* Tachibana, K.; Kabeno, H.; Kobayashi, Y. (Nissui Pharmaceutical Co., Ltd., Saitama, Japan). *Jap. J. Pharmacol.* 23(2):233-242, 1973.

5036 THE EFFECT OF PROSTAGLANDIN E_1 ON THE SECRETION AND THE MOTILITY OF THE HUMAN STOMACH. *(E.)* Classen, M.; Stürzenhofecker, P.; Koch, H.; Demling, L. (Med. Clin., Erlangen-Nuremberg Univ.). *Acta Hepato Gastroenterol.* 20(2):159-162, 1973.

5037 A STUDY OF THE METABOLIC ACTIVITY OF THE GASTRIC MUCOSA BEFORE, AT AND AFTER VAGAL STIMULATION. *(E.)* Benjamin, H. B.; Kaplan, S.; Hau, T. (Med. Coll. Wisconsin, Milwaukee). *Am. J. Gastroenterol.* 57(6):547-557, 1972.

5038 EFFECT OF HISTAMINE AND N',N'-DIMETHYLHISTAMINE ON GASTRIC SECRETION IN THE ANESTHETIZED RAT. *(It.)* Cavaggioni, A. L.; Zappia, L.; Mossini, F.; Bertaccini, G. (Inst. Pharmacol., Univ. Parma, Italy). *Ateneo Parmense* 42(2):97-102, 1971.

5039 EFFECT OF PENTAGASTRIN AND HISTAMINE ON ADENYLCYCLASE ACTIVITY IN RAT STOMACH. *(Rus.)* Bersimbaev, R. I.; Argutinskaia, S. V.; Salganik, R. I. (Inst. Cytol. Genet., Novosibirsk, USSR). *Biokhimiia* 37(4):792-796, 1972.

5040 DIFFERENCES IN THE CHEMICAL COMPOSITION OF THE MUCOUS MEMBRANES OF THE BODY AND PYLORUS OF THE STOMACH. *(E.)* Nalivaiko, D. G. (A. A. Bogomolets Med. Inst., Kiev). *Bull. Exp. Biol. Med.* 74(10):1266-1268, 1973.

5041 BIOCHEMICAL MECHANISMS IN THE REGULATION OF HYDROCHLORIC ACID SECRETION IN THE STOMACH. *(Rus.)* Salganik, R. I.; Bersimbaev, R. I.; Argutinskaia, S. V. (Inst. Cytol. Genet., Novosibirsk, USSR). *Dokl. Akad. Nauk SSSR* 206(1):236-239, 1972.

5042 THE PRODUCTION OF HEIDENHAIN POUCHES TO INVESTIGATE GASTRIC JUICE IN DOGS. *(Turk.)* Timlioglu, B. E. (Fac. Med., Ankara Univ., Turkey). *Tip Fak. Mecm.* 24(6):1049-1059, 1971.

See also, 5013, 5036, 5123, 5195.

043 A MODEL OF PANCREATIC LIPASE AND THE ORIENTATION OF ENZYMES AT INTERFACES. *(E.)*

rockerhoff, H. (Fisheries Res. Board Canada, Hali- ax, Canada). *Chem. Phys. Lipids* 10(3):215-222, 973.

model is proposed for the interfacial orientation nd the mode of action of lipase. The active site f lipase is oriented near the oil-water boundary. his orientation is achieved by oil-enzyme bonding t the "hydrophobic head" of the enzyme, a region ree of electric charges and relatively resistant o unfolding. The measured K_M is a complex constant ncluding the dissociation constant of this oil- nzyme "complex". The interfacial orientation of ipase is further aided by hydrophilic negative harges on the "back" of the enzyme and by a hydro- hilic carbohydrate "tail". Similar hydrophobic eads and hydrophillic tails and asymmetric charge istributions may establish the orientation of many nzymes which act at interfaces. Many phospholi- ases appear to be charge-oriented and, similarly, he carbohydrate residues of ribonucleases and many ther glycoproteins may be hydrophilic tails. Lip- se is probably a serine enzyme with a catalytic enter similar to that of chymotrypsin, but more indered, perhaps due to a leucine residue. There s no binding of substrate lipid chains in the 'active complex". The substrate molecule is fixated n the enzyme in a 2-dimensional orientation because ts leaving alkoxy group must be received by the serine hydroxyl hydrogen which is directed toward the imidazole ring of the reactive histidine through a hydrogen bond. The high turnover rate of lipolysis, 5 x 10^5/min, results from an extremely high substrate concentration near the active site, plus an almost complete extrusion of water because of the hydrophobicity of both the active site and the substrate. In addition, both substrate and enzyme, because of their polarity, are already so favorably positioned at the interface that the formation of the "active complex" requires only a proper 2-dimensional alignment, perhaps with partial extraction of the substrate molecule from the lipid phase.

5044 STIMULATION OF PANCREATIC SECRETION OF ENZYMES BY ACUTE HYPERCALCAEMIA IN MAN.

(E.) Goebell, H.; Steffen, C.; Baltzer, G.; Bode, C. (Med. Clin., Univ. Marburg/Lahn, Germany). *Eur. J. Clin. Invest.* 3:98-104, 1973.

Acute hypercalcemia was induced by infusion of 0.5 mEq/kg/hr calcium (as calcium gluconate). Its effect on fluid production and on concentration and output of bicarbonate, lipase, chymotrypsin, trypsin, and calcium in the duodenal juice was studied in 2 groups of normal subjects. In group I (7 males, aged 22-58 yr) the pancreas was stimulated with 0.25 clinical U/kg/hr of pure natural secretin, and in group II (11 males and 2 females, aged 25-60) with 1 clinical U/kg/hr. The calcium infusion was superimposed after 60 min, and the experiment concluded 45 min later with a single injection of 1 U pancreozymin/kg. Hypercalcemia had no effect on the secretion of fluid or bicarbonate in group I. In group II, studied with a high dose of secretin, hypercalcemia led to increased production of fluid but not of bicarbonate. Hypercalcemia stimulated significantly the output of enzymes by a factor of 2-3, independently of the secretin-stimulated flow-rate of the juice. Output of calcium was also significantly higher in the hypercalcemic state than in the secretin period. The stimulatory action of calcium on the pancreatic secretion of enzymes is interpreted by analogy to the known effects of hypercalcemia on gastric secretion in man.

5045 EFFECT OF PROSTAGLANDIN F$_2\alpha$ ON THE SECRETION OF PANCREATIC JUICE INDUCED BY SECRETIN AND BY DOPAMINE. *(E.)*

Iwatsuki, K.; Furuta, Y.; Hashimoto, K. (Tohoku Univ, Sch. Med., Sendai, Japan). *Experientia* 29(3):319-320, 1973.

The effect of prostaglandin F$_2\alpha$ (PGF$_2\alpha$) on secretin- and dopamine-induced pancreatic secretion was investigated in 7 adult mongrel dogs using a blood-perfused isolated canine pancreas preparation. Sodium heparin (300 U/kg) was given at the start of the perfusion with a supplementary 200 U given i.v. at 1 hr intervals. PGF$_2\alpha$ was injected into a rubber tube connected to the arterial cannula at a volume of 0.1 ml for 4 sec. Secretin and dopamine were infused intra-arterially at a rate of 0.1 ml/min. Secretin (intra-arterial infusion, 0.05 U/min) caused pancreatic secretion to start immediately and reach a constant level. PGF$_2\alpha$ (100 μg intra-arterial infusion) caused the secretion rate to diminish gradually and reach maximum inhibition in 5 min, with subsequent gradual return to normal. PGF$_2\alpha$ caused a transient increase of about 5 ml/min in perfusion blood flow and a decrease in systemic blood pressure of about 10 mm Hg. Pancreatic secretion induced by dopamine (2.0 μg/min) was not inhibited by PGF$_2\alpha$ at 100 μg, but was slightly inhibited by PGF$_2\alpha$ at 300 μg. Thus in the blood-perfused canine pancreas PGF$_2\alpha$ does not interfere with dopamine-induced pancreatic secretion in the same way as with secretin-induced secretion.

5046 RELATIONSHIP OF CYCLIC AMP TO SECRETIN STIMULATION OF THE PANCREAS. *(E.)*

Tompkins, R. K.; Kuchenbecker, S. L. (Univ. California Sch. Med., Los Angeles). *J. Surg. Res.* 14(2): 172-176, 1973.

Extraduodenal cannulae in the major pancreatic ducts were prepared in 9 mongrel dogs. Each animal's pylorus was ligated and common bile duct was cannulated. Secretin (0.37 U/kg bolus i.v.) plus theophylline (16 mg/kg bolus i.v.) produced greater volumes of pancreatic juice in the resting pancreas than secretin alone, whether given before or after another secretin injection of the same dosage. The volume response to secretin plus theophylline was greater when given 60 min after a secretin injection than when it preceded the secretin injection, reflecting the longer biological half-life of theophylline which accentuates the effect of subsequent injections of secretin. In animals receiving a constant secretin stimulation, an immediate marked rise in pancreatic juice volume (over 4 times the normal value) was noted on theophylline injection. This volume rise was associated with a marked increase in the bicarbonate ion and a decrease in the chloride ion concentrations consistent with a heightened secretin response. The phosphodiesterase inhibition noted in these experiments indicates that secretin's effects on the exocrine pancreas are enhanced by cyclic AMP. Secretin also appears capable of stimulating increases in the cyclic AMP concentration of pancreatic tissue of experimental animals.

5047 AMINO ACID LEVELS IN RAT PANCREAS AFTER PILOCARPINE OR PANCREOZYMIN. *(E.)* *(E.)* Robberecht, P.; Deschodt-Lanckman, M.; Camus, J.; Kutzner, R.; Christophe, J. (Univ. Brussels Sch. Med., Belgium). *Am. J. Physiol.* 224(6):1309-1313, 1973.

The levels of a series of nonessential amino acids were rapidly altered in albino rat exocrine pancreas after administration of secretogogues. The peak secretory response observed at 30 min after pilocarpine injection (30 mg/kg i.p.) was accompanied by elevations of alanine (+238%) and aspartate (+66%) and diminutions of glutamine (-31%) and glutamate (-20%). These opposite variations in aspartate and alanine levels on the one hand and the glutamate and glutamine levels on the other were probably efforts on the part of the pancreas to reestablish the thermodynamic equilibria of redox potentials upset by the secretory process. The shorter secretory cycle induced by pancreozymin (23 Crick, Harper, and Raper U/kg administered i.v. under Nembutal anesthesia) also led to opposite variations of aspartate, glutamine, and glutamate. Aspartate almost tripled in the pancreas after 10 min, whereas glutamine and glutamate levels were depressed by 43 and 31%. In the liver, pilocarpine stimulation increased the levels of alanine (+71%) and aspartate (+43%) and decreased glutamine (-49%) at 30 min postinjection. Pancreozymin administration was not associated with rapid changes in levels of liver amino acids.

5048 PROGRESS REPORT. PERFUSION OF THE PANCREAS. *(E.)* Scratcherd, T.; Case, R. M. (Dept. Physiol., Univ., Leicester, England). *Gut* 14(7):592-598, 1973.

5049 HUMAN PANCREATIC ENZYMES. CHARACTERIZATION OF ANIONIC HUMAN TRYPSIN. *(E.)* Mallory, P. A.; Travis, J. (Dept. Biochem., Univ. Georgia, Athens). *Biochemistry* 12(15):2847-2851, 1973.

5050 PHYSIOLOGIC STUDIES DURING PERFUSION OF THE ISOLATED CANINE PANCREAS. *(E.)* Meyer, W.; Castelfranchi, P. L.; Schultz, L. S.; Ruiz, O. J.; Hendrickx, J.; Aquino, C. J.; Lillehei, R. C. (Univ. Hosp., Dusseldorf, Germany). *Eur. Surg. Rev.* 5(2):105-115, 1973.

5051 THE EXCRETION OF 5,5-DIMETHYL-2,4-OXAZOLIDINEDIONE FROM THE CANINE PANCREAS AND LIVER. *(E.)* Noda, A.; Toda, Y.; Hayakawa, T.; Nkajima, S. (Nagoya Univ. Hosp., Japan). *Am. J. Dig. Dis.* 18(5):498-505, 1973.

5052 RATIO OF CHYMOTRYPSIN TO TRYPSIN IN HUMAN DUODENAL ASPIRATE. *(E.)* Goldberg, D. M.; Sale, J. K.; Wormsley, K. G. (Roy. Infirm., Sheffield, England). *Digestion* 8(2):101-109, 1973.

5053 ESTROGEN-BINDING TO PANCREAS. *(E.)* Kirdani, R. Y.; Sandberg, A. A.; Murphy, G. P. (Roswell Park Mem. Inst., Buffalo, N.Y.). *Surgery* 74(1):84-90, 1973.

See also, 5013, 5098.

Hepatobiliary Tract

5054 THE POOL OF FREE PROLINE IN ACUTE AND CHRONIC LIVER INJURY AND ITS EFFECT ON THE SYNTHESIS OF COLLAGEN AND GLOBULAR PROTEINS.

(E.) Chvapil, M.; Ryan, J. N. (Arizona Med. Ctr., Tucson). *Agents Actions* 3(1):38-44, 1973.

Ethionine (40-50 mg/100 g) was injected into Spraque-Dawley rats with no change in free proline concentration 4 hr later. However, specific activity of the proline pool was considerably increased, while the rate of incorporation of ^{3}H-proline into liver total proteins was inhibited 89%. The specific activity increase of free proline may reflect a decreased utilization of the label due to specific inhibition of protein synthesis by ethionine. Liver damage induced by dimethylnitrosamine (DMN, 3 mg/100 g) administered intragastrically was evidenced by increased labilization of liver lysosomes and elevated levels of serum isocitric dehydrogenase, plus a significant increase in total amount and specific activity of free proline. Chronic liver injury was induced by administering 4 ml of a solution containing 500 ppm DMN, by intragastric gavage on 3 consecutive days each week over a 3 week period. Total noncollagenous protein and microsomal protein were significantly decreased. There was a 3-fold increase in the concentration and synthesis of total liver collagen. Results obtained in these experiments suggest that striking labilization of lysosomes with release of proteases should cause an increase in the catabolism of proteins resulting in increased concentrations of free proline, as well as decreased incorporation of the label into proteins followed by a decreased protein concentration in the tissue. The size of the pool of free amino acid used as a marker for evaluating protein synthesis is very important. It is assumed that the total free proline pool in the liver reflects the intracellular concentration of the free label, which is the direct source for protein synthesis.

5055 EFFECTS OF ALTITUDE STRESS ON MITOCHONDRIAL FUNCTION.

(E.) Gold, A. J.; Johnson, T. F.; Costello, L. C. (Howard Univ. Coll. Med., Washington, D.C.). *Am. J. Physiol.* 224(4): 946-949, 1973.

Groups of Wistar rats fed *ad lib* were exposed continuously to a simulated altitude of 25,000 ft for 7 days. Control groups were maintained simultaneously at ground level (less than 200 ft above sea level), some fed *ad lib* and some restricted to the quantity of food consumed voluntarily by altitude animals. Food intake and body weight declined and hematocrit increased with altitude stress. Dinitrophenol-stimulated respiratory rate, succinate-stimulated respiratory rate (State 4), ADP/O ratio, and cytochrome *c* oxidase activity of mitochondria isolated from liver and kidney tissues were determined *in vitro*. Significant decreases in respiratory capacity of liver and kidney mitochondria and in State 4 respiratory rate of kidney mitochondria from altitude-exposed rats were observed. Decreases in mitochondrial respiratory function were associated with the state of semistarvation induced by the stress. Efficiency of oxidative phosphorylation and cytochrome *c* oxidase activity were unaffected. Plasma pyruvate and lactate levels were increased in altitude-exposed animals, but these changes were unrelated to semistarvation. The substantial loss of body weight consistent with hypophagia at altitude appears due largely to a reduction in stored fat.

5056 LIVER REGENERATION FOLLOWING PARTIAL HEPATECTOMY. EFFECT OF AFLATOXIN B_1.

(E.) Tilak, T. B.; Krishnamurthi, D. (Natl. Inst. Nutrition, Jamai Osmania, India). *Arch. Pathol.* 96(1): 18-20, 1973.

The effect of aflatoxin B_1 on liver regeneration following partial hepatectomy was studied in male albino rats employing liver weights and mitotic indices as measurements. Partial hepatectomy was performed on 42 rats while 26 animals were sham-operated. At 28 hr, 14 hepatectomized rats were killed to determine the extent of regeneration. There was about a 50% increase in the relative weight of the remaining portion of the liver. Hepatectomized rats (14) and sham-operated animals (13) received aflatoxin B_1 dissolved in propylene glycol (600/μg/kg and 2 mg/kg p.o.,) resp. The remaining hepatectomized and sham-operated animals received propylene glycol alone. All animals received colchicine 44 hr after surgery and were killed 4 hr later. In those animals receiving aflatoxin B_1, weight gain ceased 20 hr after toxin administration, whereas those receiving propylene glycol continued to gain to the 28 hr limit. Results indicate that aflatoxin B_1 only completely stopped the increment of the liver weight but also markedly suppressed hepatocellular replication.

5057 HEXACHLOROBENZENE AND RAT LIVER.

(E.) Medline, A.; Bain, E.; Menon, A. I.; Haberman, H. F. (Toronto Western Hosp., Canada). *Arch. Pathol.* 96(1):61-65, 1973.

Adult male Sprague-Dawley rats were fed a diet containing 0.2% hexachlorobenzene. Light and electron microscopic studies on the liver were carried out at weekly intervals up to the end of the 9th week. At the end of the 3rd week, there was marked enlargement of hepatocytes, with many containing 1 or more discrete eosinophilic laminated cytoplasmic bodies, (2-20μ in diameter). The intracytoplasmic structures were seen on electron microscopy to be of 2 types; "fingerprint" and "myelin-like." Proliferation of smooth endoplasmic reticulum, formation of large lipid droplets, and protrusion of hepatic cytoplasm through the space of Disse into the sinusoids were also observed. The protrusion may reflect artifacts in an already damaged plasma membrane, or it may represent the initial stages in the formation of acidophilic bodies which were so evident on light microscopy.

5058 EFFECT OF A THERAPEUTIC AGENT (ES 914) FOR THE LIVER ON DAMAGE INDUCED IN RAT LIVER BY ALLYL ALCOHOL. *(Ger.)* Renker, H.; Chariatte, N.; Dittrich, A.; Wegmann, A. (Swiss Serum Innoculation Inst., Bern). *Arzneim. Forsch.* 22(6):1009-1011, 1972.

SGOT levels were measured in Wistar rats before and 24 hr after administration of a single dose of allyl alcohol (3 ml/kg of a 2% solution p.o. through an esophageal sound). The allyl alcohol was followed, 1 hr later, by α,α-dithiodicaproic acid (ES 914; 125-500 mg/kg p.o.), methionine + choline (125-500 mg/kg p.o.), or 0.2 ml/kg liver hydrolyzate i.m. At all doses, ES 914 completely prevented increases in SGOT levels induced by allyl alcohol. The only other group in which the hepatotoxicity of allyl alcohol was significantly reduced was the one given 125 mg/kg methionine + choline. No appreciable difference was found between the SGOT levels of controls and those of rats treated with liver hydrolyzate.

5059 EFFECTS OF DRUGS OR HEPATOTOXINS ON THE RELATION BETWEEN DRUG METABOLIZING ACTIVITY AND PHOSPHOLIPIDS IN HEPATIC MICROSOMES DURING CHOLINE DEFICIENCY. *(E.)* Cooper, S. D.; Feuer, G. (Banting Inst., Univ. Toronto, Canada). *Toxicol. Appl. Pharmacol.* 25(1):7-19, 1973.

Choline-deficient diets altered the effects of foreign compounds on microsomal phospholipid composition in Wistar rat liver and on microsomal enzyme activity in Carworth Farm SPF rat liver. Simultaneous treatment with phenobarbital (0.2 mmol/kg, i.p., 3 times/day) resulted in much lower levels of individual phospholids than those obtained from similarly treated animals kept on choline-supplemented diet although the changes were proportionately similar. The effect of carbon tetrachloride on phospholipids was masked by the deficient diet. Choline deficiency caused a decrease of drug-metabolizing activity and reduced all phospholipid fractions with the exception of phosphatidic acid. The induction of drug metabolism by phenobarbital or 4-methyl-coumarin (1 mmol/kg, 7 daily doses) was antagonized, whereas the inhibition by carbon tetrachloride or coumarin was potentiated as were their effects on phosphatases. *S*-adenosylmethionine microsomal-phospholipid methyltransferase activity was significantly increased in choline-deficient animals. These observations suggest that microsomal phospholipids are important in the induction and activity of drug metabolizing enzymes and that the therapeutic effectiveness of drugs must be seriously altered during conditions of adverse health.

5060 METABOLIC ALTERATIONS PRODUCED IN THE LIVER BY CHRONIC ETHANOL ADMINISTRATION. CHANGES RELATED TO ENERGETIC PARAMETERS OF THE CELL. *(E.)* Bernstein, J.; Videla, L.; Israel, Y. (Dept. Pharmacol., Univ. of Toronto, Canada). *Biochem. J.* 134(2):515-521, 1973.

Chronic ethanol (14.3 ± 0.2 g/day/kg) administration to rats for 21-27 days increased the rate of oxygen consumption from 0.82-1.25 μmol/min/g of liver. The extra respiration could be abolished by inhibition of the active transport of Na^+ and K^+. Dinitrophenol (0.1mM) activated the respiratory rate to 1.41 μmol of oxygen/g of liver in treated animals only in the presence of ouabain (1 mM). Dinitrophenol alone caused a decrease from 1.25-1.09 μmol of oxygen/min/g of liver. Ouabain alone decreased oxygen consumption to 0.87 μmol/min/g of liver. Active (ouabain-sensitive) transport of ^{86}Rb and $(Na^+ + K^+)$-stimulated adenosine triphosphatase activity was increased in the livers of the ethanol-treated animals. Chronic ethanol administration also led to a decrease in the phosphorylation potential ($[ATP]/[ADP][P_1]$) in the liver cell owing to a decrease in [ATP] and an increase in $[P_1]$. It is suggested that an increased sodium pump activity is responsible for the increased oxidative capacity and for the insensitivity to dinitrophenol observed in the livers of ethanol-treated animals.

5061 HEPATOTOXICITY OF CS_2 IN RATS: RELATION TO POSTEXPOSURE LIVER WEIGHT AND PRE-EXPOSURE CYTOCHROME P-450 LEVEL. *(E.)* Magos, L.; Butler, W. H.; White, I. N. H. (Med. Res. Council Labs., Carshalton, Surrey, England). *Biochem. Pharmacol.* 22(8):992-994, 1973.

Groups of rats with different liver cytochrome P-450 levels were obtained by feeding or starving rats given an identical phenobarbitone dose but varying the time before exposure to CS_2. Albino rats of the Porton-Wistar strain were given 2 doses of phenobarbitone sodium (i.p., the first 80 mg/kg and the second 50 mg/kg 6 hr later). Phenobarbitone pretreatment significantly increased cytochrome P-450 levels in every group, while starvation of the phenobarbitone-pretreated animals caused a further significant increase. In control rats a 1 day fast caused only a slight change in cytochrome P-450 levels, but after 2 days starvation P-450 increased significantly and was higher even than in the phenobarbitone-treated fed rats. However, animals starved for 2 days without phenobarbitone treatment did not develop histological change on CS_2 exposure. In rats treated with phenobarbitone the highest levels were in the male 48 hr starved group; this group also developed the most extensive hydropic degeneration. No relation was detected between the preexposure cytochrome P-450 levels and post-exposure liver damage. Liver weight after exposure increased in starved animals in the same order as liver damage. The liver weight correlated well with the presence and degree of hydropic degeneration observed in rats after exposure to CS_2. Comparison of preexposure cytochrome levels with either liver weight or hydropic degeneration suggests that cytochrome P-450 level is not, or at least not alone, a measure of sensitivity to the hepatotoxic action of carbon disulfide. Based on the relation between cytochrome P-450 and drug metabolizing enzymes, these results support the hypothesis that the effect of phenobarbi-

one on carbon disulfide hepatotoxicity might be
ediated through the formation of a more toxic
etabolite.

062 ORGANIC-ANIONIC CHOLERESIS IN THE DOG: COMPARATIVE EFFECTS OF SULFOBROMOPHTHALEIN, OGLYCAMIDE AND TAUROCHOLATE.

(E.) Hoenig, V.;
reisig, R. (Dept. Clin. Pharmacol., Univ. Bern,
witzerland). *Biomedicine* 18(1):23-30, 1973.

n 20 experiments performed on 9 unanesthetized
ogs, equipped with a Thomas cannula, the effect on
iliary output before and after attainment of the
ransfer maxima (Tm) was studied during i.v. in-
usion of BSP (6-11.7 and 22.2-46.9 μEq/min, resp.,)
nd ioglycamide (IGL, 6.5-25.7 and 39.3-44.7
Eq/min, resp.). A choleretic response similar
o that produced by infusions of taurocholate was
btained. With each of these 3 compounds, a
lose linear correlation was found between the
iliary output of organic anions, the bile flow
nd the excretion rate of inorganic electrolytes.
xtrapolation of the regression line in each
ielded a fraction of bile flow and of inorganic
lectrolytes excreted independent of the organic
nion output. For bile flow this fraction ranged
rom 0.08 to 0.13 ml/min. The different slopes
f the regression lines suggest that the choleretic
otency increases in the order taurocholate < BSP
 ioglycamide. The choleretic response to BSP or
GL was limited by the Tm for these compounds.
ith BSP, Tm ranged from 11.3-18.3 μEq/min; the
ile flow was increased by 100-240% compared to
ontrol. With IGL, Tm ranged from 16.3-29.2
Eq/min and bile flow was augmented by 122-285%.
hese results indicate that the biliary transfer
f BSP and IGL is associated with an increased
utput of the major inorganic electrolytes and
f water. Since BSP and IGL unlike taurocholate,
re not expected to form micelles in solution,
hey may exert an osmotic force in the canalicular
ystem roughly equal to their concentrations.
onsequently, the bile flow should be increased
ore by BSP and IGL than by taurocholate in
quimolar amounts. The role of selective solute
bsorption or excretion in the bile duct system
as not been determined.

063 STUDY OF THE PHYSICOCHEMICAL PROPERTIES OF CHROMATIN FRACTIONS FROM CELL NUCLEI NORMAL AND REGENERATING RAT LIVER.

(Rus.)
ikina, E. M.; Romanova, L. K.; Spitkovskii, D. M.
nst. Med. Genetics, Moscow, USSR). *Biul. Eksp.
ol. Med.* 74(2):38-40, 1973.

e composition and physicochemical properties of
ndensed and diffuse chromatin fractions isolated
om the nuclei of cells from normal rat liver
d from regenerating liver 20 and 32 hr after 2/3
patectomy were investigated. These times were
osen since mean maximum DNA synthesis occurs
 hr and maximum mitotic activity, 32 hr after
rtial hepatectomy. In normal liver the RNA
ncentration was highest in diffuse chromatin. At
 hr after partial hepatectomy, RNA had increased
to 35% above normal values, but at 32 hr the RNA concentrations approached normal values; protein concentrations decreased by 20% after 20 hr and approached normal values after 32 hr. Little change occurred in the RNA or protein concentrations of condensed chromatin during regeneration. Thermomechanical measurements made under physiological conditions in an ionized medium revealed that by 20 hr after partial hepatectomy a significant decrease had occurred in the macromolecular packing density of diffuse chromatin which was followed, at 32 hr, by an increase in packing density to values higher than normal. The only change occurring in the condensed chromatin fraction during regeneration was a slight tendency to superspiralization. These findings suggest that the DNA in diffuse chromatin probably becomes more available sterically during liver regeneration. This steric change in DNA, together with qualitative and quantitative changes in proteins linked to DNA, could regulate condensation processes.

5064 DISPROPORTIONATE INCREASE IN THE WEIGHT OF VARIOUS HEPATIC LOBES AFTER REPEATED PARTIAL HEPATECTOMY.

(Rus.) Iashina, I. N. (Inst. Human Morphol., Moscow, USSR). *Biul. Eksp. Biol. Med.* 75(4):102-104, 1973.

Three partial hepatectomies were performed at 1-month intervals on female albino rats. Within 2-3 weeks after removal of the left lateral and central lobes (70%), the liver had completely regenerated and its weight was the same as in unoperated controls. In the second operation, the upper part of the right lobe (32% of the regenerated liver) was removed and in the third, the lower part of the right lobe (24%). After the third operation, regeneration occurred by an increase in the weight of the caudal lobe and the stump of the right lobe; the weight of the lower caudal lobe was 1.5-1.8 times greater than that of the upper part of the caudal lobe, but regeneration rates of the upper and lower parts of this lobe were the same. The size of the caudal lobe was 8-12 times greater than in controls. Histochemical examination of the caudal lobe showed no apparent differences between the state of the sinusoids, the amount of connective tissue, or the size of hepatocyte nuclei in rats subjected to 3 partial hepatectomies and in controls. Similar results were obtained on rats subjected to 2 partial hepatectomies. These findings suggest that mitotic activity in the lower caudal lobe is higher than that in the upper part of this lobe after repeated hepatectomy.

5065 EFFECT OF VARIOUS STEROIDS ON THE HEPATIC GLUCURONIDATION AND BILIARY EXCRETION OF BILIRUBIN.

(E.) Solymoss, B.; Zsigmond, G. (Dept. Pathol., Univ. Montreal, Quebec, Canada). *Can. J. Physiol. Pharmacol.* 51(5):319-323, 1973.

In female Sprague-Dawley rats, the infusion of spironolactone (84 mg/kg) increased hepatic microsomal bilirubin-UDP glucuronyl-transferase activity from 2.64 to 5.64 nmol/mg microsomal protein;

3-beta-hydroxy-2-0-oxo-5-pregnene-16-alpha-carbonitrile (PCN, 68.7 mg/kg) caused an increase to 6.26 nmol/mg microsomal protein. Phenobarbital (50.8 mg/kg) caused an increase to 3.14; and cortisol (80.0 mg cortisol acetate) raised the value to 3.14 nmol/mg microsomal protein. PCN, spironolactone, and phenobarbital increased liver weight. All three steroids and phenobarbital enhanced bile flow as well as the biliary T_m of bilirubin, expressed/kg body weight. The T_m of ethylanthranilate azo-pigments was enhanced in each steroid-pretreated group. The fact that cortisol enhanced bile flow and increased the biliary T_m but did not augment the bilirubin-glucuronidating capacity of the liver indicates that bile flow may, under certain conditions, become a determining factor for maximal biliary excretion of bilirubin. On the basis of pigment analysis, spironolactone and PCN accelerated the excretion of glucuronidated bilirubin since not only the relative amount of fraction IV (azo-pigment combined with glucuronic acid and hydrolyzable with beta-glucuronidase) was increased, but the T_m of the conjugated pigment was also enhanced. Spironolactone and PCN, unlike phenobarbital, augmented the biliary concentration of fraction III (relatively acid-resistant, azo-pigments combined with unknown hexuronic acids and not hydrolyzable with beta-glucuronidase).

5066 ACUTE ALCOHOLIC FATTY LIVER IN THE RHESUS MONKEY.

(E.) Nair, C. R.; Saha, S.; Chakravarti, R. N.; Chhuttani, P. N.; Datta, D. V. (Postgrad. Inst. Med. Ed. Res., Chandigarh, India). *Clin. Sci.* 44(5):505-510, 1973.

The effect of i.v. infusion of ethanol on the concentration of plasma free fatty acids (FFA) and triglycerides (TG) and on hepatic triglyceride content was studied in Rhesus monkeys. By 2 hr after infusion plasma FFA was 22-70% higher than pre-infusion levels, and the elevation was still significant 4-6 hr later. Blood alcohol level, a maximum at 390 mg/100 ml at the end of infusion, fell to a mean of 79 mg/100 ml at 6 hr. Prior treatment with a beta-receptor blocking agent, DL-1-(4'-nitrophenyl)-2-isopropylaamino ethanol hydrochloride (INPEA), caused an initial fall in the plasma FFA, which subsequently rose but remained below the pre-infusion level for 6 hr. Adrenalin (15 µg/kg) administered for 20 min in these animals failed to cause any elevation of plasma FFA, showing that receptors were apparently blocked. Alcohol infusion in monkeys blocked with INPEA produced no change in plasma FFA and values remained below pre-infusion levels. At the end of alcohol infusion, no significant change in the plasma TG had occurred. At 2, 4, and 6 hr after the infusion, however, varying degrees of fall in plasma TG were observed. Administration of ethanol to blocker pre-treated animals produced no significant change in plasma TG. Infusion of ethanol alone or blocker with ethanol resulted in a significant elevation of liver triglycerides 6 hr after infusion. Histological evidence of diffuse fatty changes was obtained in 6 of 7 examined monkeys infused with alcohol. Those monkeys given alcohol infusion along with the blocker showed similar degrees of fatty changes. FFA elevation following ethanol infusion may be one of the contributory factors in the pathogenesis of fatty liver. However, the elevated liver triglyceride even after the adrenergic blockage of peripheral mobilization suggests that increased peripheral lipid mobilization may not be the principal factor in acute fatty liver pathogenesis, but may be related to a more direct effect of ethanol on the liver.

5067 METABOLIC CONTROLS IN PRECANCEROUS LIVER. IV. LOSS OF FEEDBACK CONTROL OF CHOLESTEROL SYNTHESIS AND IMPAIRED CHOLESTEROL UPTAKE IN ETHIONINE-FED RATS.

(E.) Horton, B. J.; Sabine, J. R. (Waite Agr. Res. Inst., Univ. Adelaide, Australia). *Eur. J. Cancer* 9(1):11-17, 1973.

Liver cholesterol synthesis in ethionine-fed male hooded-Wistar rats was measured *in vivo* as plasma levels of 7-dehydrocholesterol following a single dose of trans-1,4-*bis*(2-chlorobenzylaminomethyl)-cyclohexane dihydrochloride, an inhibitor of cholesterogenesis. Within 2 weeks of beginning ethionine treatment hepatic cholesterol synthesis was increased and feedback control over this synthesis was lost. This confirms earlier studies with carcinogens, N-2-fluorenylacetamide and aflatoxin. The degree of loss of control of cholesterol synthesis was not related to the variable toxicity of the ethionine to the test rats. The hepatic uptake of ^{14}C-cholesterol, particularly as cholesterol ester, following a single, intragastric dose of 4-^{14}C-cholesterol was considerably reduced by ethionine feeding. This suggests that the ethionine-treated liver is defective in its mechanism for removing chylomicron-cholesterol from the plasma, an essential requirement for effective feedback control of cholesterol synthesis. Defective uptake of dietary cholesterol has also been observed in fully-developed hepatomas, all of which similarly lack feedback control of cholesterol synthesis. The most likely cause for loss of feedback control of cholesterol synthesis is an alteration in either external or internal cell membranes.

5068 RIBOFLAVIN ENHANCEMENT OF BILIRUBIN PHOTOCATABOLISM IN VIVO.

(E.) Kostenbauder, H. B.; Sanvordeker, D. R. (Albert B. Chandler Med. Ctr., Univ. Lexington, Ky.). *Experientia* 29(3): 282-283, 1973.

Adult male jaundiced Gunn rats were dosed with 75 mg/kg of the monosodium salt of riboflavin 5'-phosphate (FMN) administered in 0.7 to 1.0 ml of normal saline solution via the penis vein every 9 hr until 36 hr had passed, and then every 12 hr for the duration of the experiment. The backs of the rats were shaved and the animals were then exposed to fluorescent lighting. With light intensity of 750-1100 foot candles no difference was detected in the rates of decline of plasma bi-

rubin levels in the jaundiced controls and in the
N-treated rats. At exposure to light of 300 foot
ndle intensity a markedly increased reduction in
asma bilirubin occurred in FMN-treated rats. Both
e FMN-treated and nontreated rats leveled off
the reduction of plasma bilirubin at approximate-
the same plateau, but the FMN-treated rats
ached this plateau in a shorter span of time.
r FMN-treated animals kept in the dark, there
s no change in bilirubin. Thus there is a
tential for improving the efficiency of bili-
bin phototherapy through systemic administration
an appropriate agent. It is not suggested on
e basis of current knowledge that FMN be used
these admittedly high dose levels.

69 GLUCOSE TOLERANCE AND BLOOD METABOLITE CHANGES IN GALACTOSAMINE HEPATITIS AND
STRUCTIVE JAUNDICE IN THE RAT. *(E.)* Record, C.
; Alberti, K. G. (Radcliffe Infirm., Oxford,
gland). *Eur. J. Clin. Invest.* 3:130-135, 1973.

ucose tolerance and blood metabolite changes
re measured in starved male Wistar rats 24
after D (+)-galactosamine treatment or 9 days
ter bile duct ligation. In galactosamine-treated
ts (0.5 g/kg) there were enhanced glucose removal
ter i.v. glucose (1 g/kg) and hyperinsulinism in
e early part of the test. Fasting blood lactate
d pyruvate concentrations were elevated in galac-
samine-treated rats (1 g/kg) and there was a
eatly accentuated rise in blood lactate concen-
ation after i.v. glucose (2.20 compared with 0.90
), suggesting decreased gluconeogenesis. There
s enhanced glucose removal following i.v. glucose
days after bile duct ligation when compared with
ntrols. Lactate and pyruvate concentrations were
ansiently elevated after i.v. glucose in the
gated rats consistent with the increased rate of
ucose removal. Fasting ketone bodies were
creased in the ligated rats (2.87 compared with
50 mM) due to diminished fat stores, and this
creased ketosis probably results in glucose
moval comparable to that seen in fed rats. The
nding of high fasting blood lactate and pyruvate
ncentrations with an enhanced and prolonged rise
ter i.v. glucose suggests that glucose synthesis
om these metabolites is severely reduced in this
del of acute hepatitis. Contrastingly, where
ver cell necrosis is only minimal, such as after
le duct ligation, gluconeogensis is probably
rmal.

70 THE ROLE OF HEPATIC TISSUE PHOSPHATASES IN THE MECHANISM OF BILE PRODUCTION. *(Rus.)*
nanenko, V. D. (A. A. Bohomol'ets Inst. Physiol.,
ev, USSR). *Fiziol. Zh. SSSR.* 59(3):475-479, 1973.

studies performed on fasting, anesthetized dogs
rabbits, measurements were made of the secre-
n and concentration of electrolytes in the bile
the activities of alkaline phosphatase (gly-
ophosphatase) and ATPase in the liver. The
ase activity in rabbit liver (13.97 mg/g in-
anic phosphorus) was almost twice that in dog
liver (7.23 mg/g inorganic phosphorus) and was associated with faster secretion of both bile acids and inorganic components in the bile. Although bile electrolytes were secreted more rapidly in rabbits than in dogs, rabbit bile contained lower concentrations of Na$^+$, K$^+$, and Ca^{++}. The concentration of bile acids was 5.6 times higher in dogs than in rabbits although the rate of bile acid secretion was 3.5 times faster in rabbits than in dogs. Liver glycerophosphatase activity averaged 3.91 mg/g inorganic phosphorus in dogs and 2.17 mg/g inorganic phosphorus in rabbits. When calcium chloride (10 mg/kg/hr) was infused into the portal vein of these animals, both ATPase and glycerophosphatase activity increased to a much greater extent in the livers of dogs than in those of rabbits. In dogs, 2 hr after calcium chloride infusion had begun, biliary secretion of Ca^{++} had increased by about 212%, Na$^+$ by 15.9%, and K$^+$ by 58.3%. Calcium chloride infusion had much less effect on electrolyte secretion in rabbits: only Ca^{++} secretion increased significantly. These findings suggest that Ca^{++}-dependent ATPase and glycerophosphatase in the liver play an important role in regulating bile production and secretion.

5071 D-GALACTOSAMINE AND ACUTE LIVER CELL INJURY. *(E.)* Shinozuka, H.; Farber, J. L.; Konishi, Y.; Anukarahanonta, T. (Fels Res. Inst., Philadelphia, Pa.). *Fed. Proc.* 32(4): 1516-1526, 1973.

A single injection of D-galactosamine, i.p., to rats induces liver cell damage leading to periportal infiltration of inflammatory cells, disruption of lobular architecture, and liver cell necrosis. The severity of the lesion is dose dependent. At 200 mg/kg, galactosamine causes severe disturbance of RNA and protein metabolism in the liver cells without inducing cell necrosis and from which liver cells spontaneously recover. Inhibition of nuclear RNA synthesis was more than 90% by 2 hr after galactosamine injection and was accompanied by fragmentation of nucleoli. A disappearance of fragments led to the development of small spherical nucleoli composed entirely of fibrillar material. At a time when the *in vivo* rate of RNA synthesis was inhibited by more than 90% in the galactosamine-treated animals, the ability of nuclei isolated from the liver of these animals to synthesize RNA *in vitro* was perfectly normal. The administration of uridine either simultaneously with or 2 hr after galactosamine injection completely protects against and reverses *in vivo* inhibition of RNA synthesis. Uridine also protects and reverses the galactosamine-induced nucleolar fragmentation. These results suggest that galactosamine-induced disturbance of RNA metabolism and the associated changes in nucleolar morphology are due to an acute deficiency of uridine triphosphate (UTP) as a substrate for the nuclear RNA polymerases. Inhibition of protein synthesis induced by galactosamine was accompanied by accumulation of aggregates of an unknown nature between the stacks of rough endoplasmic reticulum of liver cells. It is suggested that these aggregates may be a complex of ribosomes and some undetermined moieties of carbohydrate and may represent a morphological manifestation of the disturbance of glycoprotein synthesis. Isolation of these aggregates in pure form by differential centrifugation may be possible. Electron-microscopic studies showed that administration of uridine neither protected nor reversed the formation of the aggregates induced by galactosamine. *In vivo* inhibition of protein synthesis was prevented or reversed to 60-80% of control level on administration of uridine. There appear to be 2 specific biochemical lesions that are related to the hepatotoxic action of galactosamine; UTP deficiency and the accumulation of uridine diphosphate-sugar nucleotides. The latter may contribute to the change in the rough endoplasmic reticulum and to the disturbance of protein metabolism.

5072 REGULATION OF FATTY ACID SYNTHESIS IN ISOLATED HEPATOCYTES. EVIDENCE FOR A PHYSIOLOGICAL ROLE FOR CHAIN FATTY ACYL COENZYME A AND CITRATE. *(E.)* Goodridge, A. G. (Banting Best Dept. Med. Res., Univ. Toronto, Canada). *J. Biol. Chem.* 248(12):4318-4326, 1973.

Fructose or dihydroxyacetone stimulation of fatty acid synthesis in isolated hepatocytes prepared from unfed neonatal chicks required acetate or octanoate in the medium. This suggests that the stimulatory effect of these compounds required the enhanced production of intramitochondrial acetyl coenzyme A. Stimulation of fatty acid synthesis by lactate or pyruvate did not require a supplementary substrate. Distribution of acetyl-coenzyme A synthetase was 80% intramitochondrial and 20% cytosolic. However, sufficient acetate could be activated in the cytosol to accommodate the most rapid rates of fatty acid synthesis observed in isolated cells, as was shown by an undiminished rate of incorporation of [1-^{14}C]acetate plus [^{12}C]lactate or [^{12}C]fructose into fatty acids when ATP-citrate lyase was inhibited by (-) hydroxycitrate. The citrate content of the isolated cells was positively correlated with fatty acid synthesis under all incubation conditions. The ATP content of the cells did not correlate with fatty acid synthesis. Fatty acyl coenzyme A and α-glycerophosphate levels only partially correlated with fatty acid synthesis. Hence, citrate appears as an important determinant in the regulation of fatty acid synthesis in intact liver cells, probably via its ability to activate acetyl coenzyme A carboxylase. Inhibition of fatty acid synthesis by free fatty acids was reversible, did not increase with time of incubation, and was not relieved by simultaneous incubation with the inhibitor of fatty acid oxidation, (+)-decanoylcarnitine. Thus, the active inhibitor was not a stable product of the esterification of fatty acids or a product of the oxidation of fatty acids. Inhibition of fatty acid synthesis by medium free fatty acids was accompanied by an increase in the fatty acyl coenzyme A level. Fatty acyl coenzyme A may inhibit fatty acid synthesis by directly inhibiting acetyl coenzyme A carboxylase or by inhibiting the mitochondrial citrate carrier and, thereby, reducing the activation of acetyl coenzyme A carboxylase caused by citrate.

5073 EFFECT OF CHRONIC ETHANOL FEEDING ON HEPATIC MICROSOMAL GLYCEROPHOSPHATE ACYLATRANSFERASE ACTIVITY. *(E.)* Joly, J.-G.; Feinman, L.; Ishii, H.; Lieber, C. S. (Mt. Sinai Sch. Med., New York, N.Y.). *J. Lipid Res.* 14(3):337-343, 1973.

The activity and submicrosomal distribution of α-glycerophosphate acyltransferase (GPAT) were studied in Sprague-Dawley rats. After 6 weeks of ethanol feeding, GPAT activity was increased 73% when expressed per mg of protein and 133% when expressed per 100 g of body weight ($P < 0.005$). GPAT activity was more abundant in the smooth than in the rough microsomes of both control and ethanol-fed rats when expressed per mg of microsomal protein and when expressed per g of liver; the smooth microsomes accounted for most of the increased GPAT activity after ethanol. Ethanol feeding for 10 days or 22 days of phenobarbital administration did not increase GPAT activity. Feeding a high fat diet (71% of total calories) for 24 days increased GPAT activity per mg of protein to an extent similar to that observed after chronic ethanol administration. When expressed per 100 g of body weight, however, the increase was much greater after ethanol. The significance of these findings *in vivo* has not been elucidated. Increased GPAT activity might contribute to the persistence of alcoholic fatty liver and the development of hyperlipemia.

5074 ACUTE FERROUS SULFATE HEPATOTOXICITY IN RATS. AN ELECTRON MICROSCOPIC AND BIOCHEMICAL STUDY. *(E.)* Ganote, C. E.; Nahara, G. (Northwestern Univ. Med. Sch., Chicago, Ill.). *Lab. Invest.* 28(4):426-436, 1973.

Ferrous sulfate (250 and 500 mg iron/kg) was toxic when administered by gavage to male Sprague-Dawley rats. The higher dose resulted in 70% mortality within 12 hr with most animals exhibiting periportal or midzonal liver cell necrosis. With the lower dose most animals survived and few developed hepatic necrosis. Within 1 hr following iron ingestion rats developed peripheral vasoconstriction and diarrhea and were listless but exhibited only moderate decreases in blood pressure. Electron microscopy showed that parenchymal cells irreversibly injured by iron became greatly swollen prior to necrosis. Mitochondrial changes were the first observed and consisted of swelling, contraction, and development of particulate and amorphous densities in the matrix space. In addition all animals given iron, including those which had no other evidence of cell injury, showed highly characteristic granules in the intracristal lumen of liver cell mitochondria. These granules may be unique to cells actively adsorbing high iron loads. Polarographic studies of mitochondria isolated at 3 or 5 hr from animals with hepatic injury demonstrated decreased or absent respiratory control ratios due both to an increased state 4

te and a decreased state 3 rate. Both liver cell
crosis and alteration of mitochondrial respira-
on were more severe at 5 than at 3 hr, which sug-
sts that these effects are related. The results
ggest that iron produced both systemic toxicity
d direct liver cell toxicity. The mechanism of
on hepatotoxicity may be primary mitochondrial
jury.

5 CHANGES IN THE CONTENT OF CHOLESTEROL AND ITS ESTERS IN RAT TISSUE DURING LIGATION
THE COMMON BILE DUCT. *(Rus.)* Kolmakov, V. N.
ningrad Med. Inst., Sanit. Hyg., USSR). *Patol.*
iol. Eksp. Ter. (3):72-73, 1972.

male and female rats, whole body total cholesterol
reased and reached a maximum (245 mg%) 10 days
er bile duct ligation. By the 20th day after
gery, total cholesterol levels had decreased to
ir initial values. Whole body cholesterol
ers increased significantly 4 days after surgery
mg%) and decreased to their original levels
mg%) within 10-20 days. Although no significant
nge occurred in total cholesterol in rat liver
er bile duct ligation, cholesterol esters in-
ased significantly after 1 week. Significant
reases of total cholesterol and its esters also
urred in the skin and lungs, but no appreciable
nges were found in the intestine, spleen, and
neys after bile duct ligation. These findings
icate that the changes in cholesterol which
ur in obstructive jaundice are not restricted to
nges in the secretion of cholesterol in the bile,
involve disturbances in the enterohepatic cir-
ation which result in changes in cholesterol
osition and mobilization and, perhaps, in
lesterol catabolism and biosynthesis.

6 BILIARY AMYLASE OUTPUTS IN RATS. *(E.)*
Maezawa, H.; Ogawa, S.; Abe, K.; Ito, Y.
kyo Med. Dental Univ., Japan). *Proc. Jap.*
d. 48(9):703-708, 1972.

lase activity was demonstrated in rat bile.
usion of dehydrocholic acid (200 mg, i.v. at
ate of 100 mg/hr), caused a significant in-
ase in bile flow, peaking at 30-60 min after
rt of infusion and remaining at the high level
to 120 min later. Amylase activity decreased
, consequently, the amylase output in the bile
virtually unchanged. Plasma amylase levels
ved some insignificant rise. Since the amount
amylase excreted in bile was relatively small,
clinical significance remains unsolved. Elec-
phoretic patterns of bile and blood plasma
lase were similar. The biliary amylase output
larger in nephrectomized rats and this in-
ase seemed to compensate for a corresponding
in the urinary amylase excretion. The plasma
lase decayed more slowly in bile duct-ligated
in sham-operated rats from 2-6 hr after the
ections of hog pancreatic amylase (300 or 600
i.v.), and it is possible that the amylase out-
in the bile played some role in the regulation
its blood level.

5077 EFFECT OF THYROIDECTOMY ON CONVERSION OF CHOLESTEROL IN BILE ACIDS. *(E.)* Byers, S. O.; Friedman, M. (Mount Zion Hosp., San Francisco, Calif.). *Proc. Soc. Exp. Biol. Med.* 143(2):551-555, 1973.

Thyroidectomies were performed on 12 of 17 young adult male Long-Evans rats. Of the 12, 6 were injected with thyroid substance (2 mg/day, i.p.). All were fed a 30 ml/day liquid diet containing 70 mg cholesterol/100 ml. A week after thyroidectomy, the rats were cannulated and injected i.v. with 0.6 ml serum containing lipoprotein cholesterol labeled with cholesterol-1α, 2α-^{3}H. The average serum cholesterol (111 mg/100 ml) of the 6 thyroidectomized but untreated rats was significantly greater than that of controls (56 mg/100 ml) or treated thyroidectomized rats (64 mg/100 ml). Six hr after injection of the labeled cholesterol, the disintegration/min of the cholesterol present in 1 ml of serum was 3.3×10^4 in thyroidectomized rats and only 2.54×10^4 and 2.62×10^4 in treated and control rats, resp. This difference was tentatively attributed to the approximately 100% difference in plasma cholesterol pool size. Liver cholesterol content was 3.62 mg/g liver in thyroidectomized mice and 2.11 mg/g liver in controls. Thyroidectomy significantly altered bile acid and cholesterol metabolism as evidenced by changes in biliary secretion. The total 6 hr volume of bile flow declines from 4.0 ml to 2.9 ml in thyroidectomized rats; administration of thyroid extract prevented this decline. Thyroidectomized rats excreted a total of 0.225 mg bile cholesterol compared with 0.44 mg for controls; administration of thyroid extract returned the biliary cholesterol excretion to 0.361 mg. Bile acid excretion in thyroidectomized rats was significantly diminished whether measured at the time that an animal's liver was still receiving bile acids reabsorbed from the intestinal tract or after such reabsorption essentially ceased. The reduced biliary secretion apparently results from the inability of the animal to catabolize cholesterol readily into bile acids. This inability is probably also the cause of the hypercholesterolemia observed in thyroidectomized animals.

5078 STUDIES ON THE PROCESS OF PEROXIDATION OF LIPIDS OF MICROSOMES AND MITOCHONDRIA OF RAT LIVER. *(It.)* Comporti, M.; Benedetti, A.; Ferrali, M. (Inst. Gen. Path., Univ. Pisa, Italy). *Riv. Ital. Sostanze Grasse* 49(12):685-692, 1972.

UV absorption bands, characteristic of conjugated dienes, appeared between 230 and 240 nm when rat liver microsomes were incubated aerobically with 10^{-4}M ascorbic acid. The height of the absorption peak increased linearly with incubation times up to 2 hr and more slowly thereafter, suggesting that progressive decreases occur in substrate available for peroxidation in the microsomal membrane due to splitting of large numbers of polyunsaturated fatty acid molecules. Malonyl dialdehyde was produced linearly for up to 1 hr of incubation with no latent phase observed. Polyunsaturated acids (arachidonic and docosanoic acids) decreased slowly and nonlinearly during incubation. The rate of lipid peroxidation was slower in rat liver mitochondria than in microsomes, perhaps because of the higher concentration of physiological antioxidants in the mitochondria than in the endoplasmic reticulum. When liver mitochondria were incubated aerobically with 10^{-4}M ascorbic acid, UV spectra had absorption peaks characteristic of both trienes (270 nm) and conjugated dienes (230-240 nm); docosanoic acid concentrations decreased progressively with time, but no change occurred in arachidonic acid until the 2nd hr of incubation. The peroxidation rate was not appreciably affected by increasing the ascorbic acid concentration 5-fold.

5079 METABOLISM OF PLASMA ALBUMIN IN RATS WITH CONGENITAL HYPERBILIRUBINEMIA (GUNN).

(E.) Nandi Majumdar, A. P.; Greenfield, S.; Roigaard-Petersen, H. (Inst. Med. Biochem., Univ. Aarhus, Denmark). *Scand. J. Clin. Lab. Invest.* 31(2):219-224, 1973.

In vivo experiments were performed to study the incorporation of [^{14}C]leucine into Gunn rat plasma albumin. The plasma albumin concentration in Gunn and normal was found to be the same. However, a 44% decrease in specific activity was observed in Gunn rat plasma albumin compared to normal. Non-albumin plasma protein in Gunn rats showed a 30% reduction in specific activity. The specific activity of the total liver protein was 27% lower in the Gunn rat compared to normal. There was no difference in the concentration of free leucine in the liver of Gunn and normal rats. The specific activity of free leucine in the liver 10 and 60 min after i.p. injection was increased 113% and 93%, resp., in Gunn rats compared to normal rats. There was no apparent difference in the half-life of [^{14}C]-labelled albumin between Gunn and normal rats. Plasma bilirubin levels remained unchanged during the turnover study. The finding of lowered specific activity of plasma albumin, non-albumin plasma protein, and total liver protein suggest that the protein synthesis is depressed in Gunn rats. The reduced synthesis of albumin in Gunn rats, plus the finding that plasma albumin concentrations remained the same in Gunn and normal rats, can be explained by a fall in the absolute degradative rate of albumin.

5080 A LIFE SUPPORTING HETEROTOPIC AUTOTRANSPLANT ON THE CANINE LIVER WITHOUT PORTAL BLOOD.

(E.) Maki, T.; Blackburn, G. L.; Slapak, M.; McDermott, Jr., W. V. (Boston City Hosp., Mass.). *Surg. Gynecol. Obstet.* 136(6):951-957, 1973.

Partial hepatic autotransplantation was performed in dogs with the use of renal vein blood as a substitute for portal blood. In 5 dogs, 25% of the total liver mass was autotransplanted prior to portacaval shunting and resection of the rest of the liver. In a second group of 5 dogs, 40% of the total liver mass was autotransplanted before portacaval shunting and resection of the remaining liver. In both groups, postoperative serum aminotransferase and bilirubin rose sharply, returning to normal in 2 dogs and remaining elevated until 3 died from bile duct stenosis or cholangitis. Serum alkaline phosphatase remained elevated for 1-2 months. The 5 dogs surviving more than 1 month had normal liver function and no neurologic signs of encephalopathy. The heterotopically placed grafts regenerated well. In another group of 7 dogs with 40% of the total liver mass autotransplanted heterotopically, residual lobes were left intact with normal vasculature and bile duct connections. Serum aspartate aminotransferase in these dogs returned to normal within 2 weeks. Serum alkaline phosphatase concentration remained in the near normal range. Some of the transplants decreased in weight after 1 month while the residual lobes increased in size. Bile duct ligation in normal residual lobes was associated with graft regeneration and atrophy of residual liver. These results demonstrate the feasibility of using renal vein blood as a life supporting substitute for portal blood inflow during temporary auxiliary liver transplantation. As the first step in a staged liver transplant, partial hepatic autotransplantation would provide a patient with chronic liver failure with a period of time during which to recover prior to further operation.

5081 BIOCHEMICAL CHANGES PROVOKED IN RAT LIVER BY CHOLESTATIC DOSES OF α-NAPHTHYLISOTHIOCYANATE.

(E.) Buxton, B. H.; Witschi, H.; Plaa, G. L. (Dept. Pharmacol., Univ. Montreal, Canada). *Toxicol. Appl. Pharmacol.* 24(1):60-72, 1973.

The acute hepatic effects of α-naphthylisothiocyanate (ANIT) on microsomal drug metabolism and other biochemical parameters were studied in male Sprague-Dawley rats. In appropriate cases, these effects were compared with those elicited by CCl_4. An ANIT dose of 150 mg/kg, po, or greater was needed to prolong pentobarbital sleeping time or zoxazolamine paralysis time 24 hr after its administration. This effect could be demonstrated 1 hr after a 300 mg/kg dose of ANIT and lasted 4-8 days. CCl_4 (1 ml/kg) also exerted its effects after 1 hr, but 72 hr later enhanced responses no longer existed. Enhanced sleeping times or paralysis times were associated with increased plasma concentrations of pentobarbital or zoxazolamine. Aminopyrine demthylase and acetanilide dehydroxylase activity were inhibited by ANIT in noninduced rats. In contrast to CCl_4, ANIT had no effect on hepatic glucose-6-phosphatase activity or on leucine incorporation into liver protein. Neither ANIT nor CCl_4 exerted an effect on orotic acid incorporation into liver RNA. The effects of ANIT (300 mg/kg) on induced enzyme activity revealed that this substance delays the appearance of increased thymidine kinase activity after partial hepatectomy, but enhances hydrocortisone-induced elevation of tyrosine transaminase activity. However, the effects of ANIT on thymidine kinase and tyrosine transaminase were also elicited with bile duct ligation, suggesting that these changes may be due to the cholestasis induced by ANIT.

RATE OF PROTEIN AND LIPID TURNOVER IN THE MITOCHONDRIA OF VARIOUS ORGANS IN RATS.
s.) Vinogradova, M. F.; Miniailo, D. D. (Sci.
, Inst. Biol., Leningrad Univ., USSR). *Ukr.
khim. Zh.* 44(4):437-441, 1972.

omparison of the protein and lipid contents of
ochondria from the small intestine, liver, brain,
cardium, and skeletal muscle of rats showed no
reciable differences in the mitochondrial pro-
n content of these organs. Mitochondrial lipid
tents were highest in the brain and lowest in
small intestine and skeletal muscle; free lip-
were present only in trace quantities. The rate
protein and lipid turnover, determined by label-
mitochondria with $2-^{14}$C-acetate, was highest
mitochondria from the small intestine and liver.
the lipid fraction, the specific radioactivity
mitochondrial lipids in the small intestine
3 times higher than that found in liver mito-
ndria, 14 times higher than that in brain mito-
ndria, and 27-30 times higher than that in
cardial and skeletal muscle mitochondria. Pro-
n turnover rates in small intestine mitochondria
e 3 times higher than in the liver, 8 times
her than in the brain, and 12-15 times higher
n in the myocardium and skeletal muscle. There
good correlation between these results and
iproprotein turnover rates determined on homo-
ates of these organs. This suggests that the
ction of mitochondria may be to integrate meta-
ic processes in the cells and, as a result, in
organ as a whole.

EFFECT OF 24-HOUR LIVER PERFUSION AND PRESERVATION ON MITOCHONDRIAL FUNCTION.
) Beaudoin, J. G.; Daniel, A.; Schreier, R.
. Victoria Hosp., Montreal, Canada). *Union Med.*
101(4):666-668, 1972.

g glucose and glutamate as substrates, mito-
drial function was measured in rat livers which
been perfused *in vitro* with various solutions
with an osmolarity of 320 milliosmol) for 24
t 4°C. A glucose solution preserved mitochon-
l function best (up to 4 days), demonstrating
the presence of electrolytes is not essential.
acellular-type solutions (Collin's solution)
more effective than extracellular types in
erving mitochondrial function. These findings
ort the hypothesis that solutions having low
and high K$^+$ concentrations retard cellular
a by using other factors than cell energy to
tain a normal gradient. Since sucrose solu-
s were markedly less effective than glucose
tions in preserving mitochondrial function,
effects observed cannot be attributed to
thermia and osmolarity alone. Although perfu-
of glucose solutions appears to preserve mito-
drial function best, further experiments should
erformed to establish that other liver structures,
, vasculature, respond in the same manner and
ot require electrolytes.

5084 TOXIC EFFECTS AND PYRROLIC METABOLITES IN THE LIVER OF YOUNG RATS GIVEN THE PYRROLIZIDINE ALKALOID RETRORSINE. *(E.)* Mattocks, A. R., White, I. N. H. (Med. Res. Council Lab., Surrey, England). *Chem. Biol. Interact.* 6(5):297-306, 1973.

5085 BIOSYNTHESIS OF RAT SERUM ALBUMIN. VII. EFFECTS OBSERVED IN LIVER SLICES. *(E.)* Peters, Jr., T. (M. I. Bassett Hosp., Cooperstown, N.Y.). *Am. J. Physiol.* 224(6):1363-1368, 1973.

5086 FREE AMINO ACIDS OF PLASMA IN THE ACUTE PHASE OF EXPERIMENTAL NECROTIC LIVER DAMAGE. *(E.)* Cacciatore, L.; Antoniello, S.; Valentino, B.; De Ritis, F. (Sch. Med., Univ. Naples, Italy). *Res. Commun. Chem. Pathol. Pharmacol.* 5(2):403-410, 1973.

5087 ISOLATION AND CHARACTERIZATION OF A PROPANIDIDE-HYDROLYZINC ENZYME FROM RAT LIVER. *(Ger.)* Ammon, R.; Quintenz, M. (Inst. Physiol. Chem., Univ. Saarland, Homburg, Germany). *Arzneim. Forsch.* 22(6):977-982, 1972.

5088 EFFECT OF ALKYLATING AGENTS ON THE ATPase ACTIVITY OF LIVER MITOCHONDRIA. *(Rus.)* Romanova, I. N. (Inst. Exp. Clin., Oncol., Moscow, USSR). *Biokhimiia* 37(4):846-850, 1972.

5089 COMBINED ACTION OF MUTAGENS AND PHENOBARBITAL ON HEPATOCYTE MITOSIS IN REGENERATING RAT LIVER. *(Rus.)* Mutovin, G. R.; Nemorovskii, L. E. (N. I. Pirogov 2nd Moscow Med. Inst., USSR). *Biull. Eksp. Biol. Med.* 74(7):95-98, 1972.

5090 SEX STEROID INFLUENCE ON HEPATIC GLUCONEOGENESIS AND GLYCOGEN FORMATION. *(E.)* Matute, M. L.; Kalkhoff, R. K. (Med. Coll. Wisconsin, Milwaukee). *Endocrinology* 92(3):762-768, 1973.

5091 IN VIVO AND IN VITRO BINDING OF CARBON TETRACHLORIDE WITH NUCLEIC ACIDS AND PROTEINS IN RAT AND MOUSE LIVER. *(E.)* Rocchi, P.; Prodi, G.; Grilli, S.; Ferreri, A. M. (Univ. Bologna, Italy). *Int. J. Cancer* 11(2):419-425, 1973.

5092 ADAPTIVE CHANGES IN GLUCOSE-6-PHOSPHATASE ACTIVITY IN RAT LIVER DURING DEVELOPMENT. *(Ukr.)* Paryna, Ye. V.; Shabanova, N. O.; Dryniayev, V. A. (Kharkov Univ., USSR). *Ukr. Biokhim. Zh.* 44(4):442-445, 1972.

See also, 4946, 4971, 4984, 4985, 4988, 5013, 5051, 5109, 5436, 5518.

Intestine

5093 EFFECT OF PUROMYCIN ON PROTEIN AND GLYCEROLIPID BIOSYNTHESIS IN ISOLATED MUCOSAL CELLS. *(E.)* O'Doherty, P. J. A.; Yousef, I. M.; Kuksis, A. (Dept. Biochem., Univ. Toronto, Canada). *Arch. Biochem. Biophys.* 156(2):586-594, 1973.

The effect of puromycin on phosphatidylcholine and triacylglycerol synthesis was studied in isolated cells of intestinal mucosa from male Wistar rats using radioactive palmitate, glycerol, 2-hexadecylglycerol, and lysophosphatidylcholine as markers. Puromycin (5 mg in 1 ml phosphate buffer, once every 8 hr for 24 hr, i.p.) was given prior to sacrifice. In addition to the *in vivo* administration, some cells in incubation flasks were treated with 1 mg puromycin. Puromycin caused a 60-65% inhibition of phosphatidylcholine biosynthesis but did not affect the formation of triacylglycerols. Under comparable conditions protein synthesis was inhibited 90-95% and glycoprotein synthesis 60-70%. The utilization of the various lipid precursors indicated that puromycin inhibited the biosynthesis of phosphatidylcholine via both the cytidine diphosphate choline and the lysophosphatidylcholine pathways, without interfering with triacylglycerol synthesis from either phosphatidic acid or monoacylglycerol precursors. Since both phosphatidylcholines and proteins are involved in the assembly of chylomicrons, the effect of puromycin on chylomicron formation could be due to an inhibition of the biosynthesis of any 1 or all 3 of the membrane components: proteins, glycoproteins, and phosphatidylcholines.

5094 INTERRELATIONSHIP OF GLUTATHIONE-CYSTINE TRANSHYDROGENASE AND GLUTATHIONE REDUCTASE IN DEVELOPING RAT INTESTINE. *(E.)* States, B.; Segal, S. (Children's Hosp., Philadelphia, Pa.). *Biochem. J.* 132(3):623-631, 1973.

Glutathione reductase and glutathione-cystine transhydrogenase activity in supernatant fractions of whole homogenates and homogenates of mucosal and muscular layers were determined in developing rat intestine after determination of the optimum conditions for assay of the 2 enzymes. In jejunum from adult rat, the K_m values for GSSG reductase and GSH-cystine transhydrogenase activities were 0.25mM-GSSG and 0.23mM-cystine, resp. The 2 activities could be differentiated by stability studies since GSSG reductase was stable at 60 C for 10 min and could be stored at 4 C for 24 hr on without loss of activity. GSH-cystine transhydrogenase, on the other hand, was denatured at 60 C and completely inactive after 24 hr storage at 4 C. Based on calculations of total activities, both enzymes increased from the 18th day until the animals were young adults. Total GSSG reductase activity increased at a greater rate with age than total GSH-cystine transhydrogenase activity as evidenced by activity ratios for GSH-cystine transhydrogenase/GSSG reductase of 0.44 and 0.12 in ileum from suckling and adult rats, resp., and 0.31 and 0.24 in jejunum from suckling and adult rats, resp. In mucosa from adult rats GSSG reductase was more active in the ileum than in the jejunum, whereas GSH-cystine transhydrogenase activity was higher in the jejunum. GSH-cystine transhydrogenase was active only in the muscle cells of the ileum of 7-day-old rats but became localized primarily in the mucosal layer in the adult rat. However, GSSG reductase activity was distributed evenly between the two layers throughout the intestine. It is suggested that GSH-cystine transhydrogenase may be the enzyme instrumental in intracellular reduction of exogenous cystine to cystine which occurs with entrance of cystine into cells. This enzyme may be essential in maintaining the intracellular environment in its proper state. Analysis of these 2 enzymes could further understanding of human cystine-storage disease.

5095 EFFECT OF PROLONGED NURSING ON THE ACTIVITY OF INTESTINAL LACTASE IN RATS. *(E.)* Lebenthal, E.; Sunshine, P.; Kretchmer, N. (Stanford Univ., Calif.). *Gastroenterology* 64(6):1136-1141, 19

Litters of 10-day-old rats and their mothers were placed in specially designed cages which enabled the pups to continue to suckle, but not to have access to water, solid foods, or feces, and ensured that their sole dietary carbohydrate was lactose. The animals were killed at intervals and intestinal β-galactosidases, α-glucosidases, and cellular proliferation were measured. Although the specific activity of intestinal lactase followed the usual decline observed during development, the enzyme was maintained at a significantly higher activity than that of control rats. These animals were also able to hydrolyze lactose more readily as demonstrated by their significantly higher blood glucose concentration after administration of oral lactose. When segments of intestine were incubated with lactose, glucose plus galactose, sucrose, mannitol, or saline, the decline in lactase activity was much less in the presence of lactose than in any of the other media. Thus, the substrate had a stabilizing or protective effect on the enzyme. The injection of actinomycin D into rats and addition into the various media did not affect either the initial activity or the decline in activity of intestinal lactase. The developmental patterns of the intestinal α-glucosidases and the "acid" β-galactosidases, and the normal morphological maturation of the intestine, were not altered by prolonged nursing and elimination of carbohydrates other than lactose.

5096 CELL MIGRATION AND CORTISONE-EVOKED DECREASE OF ACID β-GALACTOSIDASE IN THE ILEUM OF SUCKLING RATS. *(E.)* Koldovsky, O.; Herbst, J. J. (Children's Hosp. Philadelphia, Pa.). *Gastroenterology* 64(6):1142-1149, 1973.

mechanism of the decrease in acid β-galactosi-
e in the distal third of the small intestine
eum) was analyzed in cortisone-treated suckling
normally weaned Charles River rats. Injections
cortisone (5 mg/100g/24 hr daily, i.m.), be-
ning on day 9 postnatally do not evoke a de-
ase in acid β-galactosidase activity until after
ys; however, this decrease is observed 1 day
lier in rats injected initially on days 12 and
postnatally, resp. The earlier decrease in acti-
caused the values after 96 hr to be lower than
e obtained from rats injected on day 9 post-
lly. Determination of the activity of acid β-
ctosidase in homogenates of serial tissue sec-
s of villi and crypts has shown that cortisone
es the decrease in acid β-galactosidase in
rocytes along the entire height of the villus.
ng the spontaneously occuring decrease (between
16 and 21 postnatally), acid β-galactosidase
vity diminshes in enterocytes also along the
re height of the villus. The regulation of the
ral decrease in acid β-galactosidase activity
he distal third of the small intestine is seen
ccurring in 2 stages. During the first, the
β-galactosidase-producing system changes so
it is sensitive to exogenous steroid admini-
tion; during the second stage, natural secretion
ortisteroids is increased and acid β-galacto-
se activity decreases in the intestine.

THE RELATIVE DISTRIBUTION OF IgM AND IgA
CELLS IN INTESTINAL MUCOSA AND LYMPHOID
UES OF THE YOUNG UNWEANED PIG AND THEIR SIGNI-
NCE IN ONTOGENESIS OF SECRETORY IMMUNITY. *(E.)*
n, W. D.; Porter, P. (Unilever Res. Lab., Bed-
, England). *Immunology* 24:493-501, 1973.

mparative study of cells synthesizing immuno-
ulins IgA and IgM in intestinal mucosa and
ous lymphoid tissues of unweaned piglets was
by immunofluorescence. The lamina propria of
small intestine contained as many cells syn-
izing IgM as those producing IgA. In all other
noid organs examined, including Peyer's patches,
number of IgM cells was significantly higher.
largest population of intestinal immunocytes
rred in the lamina propria of the duodenum where
counts were 10 times greater than in the jejunum
leum. Since the alimentary tract is probably
first organ in the young pig to come in contact
any major antigenic challenge, it is of parti-
importance in the development of the animal's
immune defenses. The finding that the number
gM cells outnumbered those containing IgA at
levels of the small intestine differs from
ts of previous studies; a possible explanation
at the animals used in the current investigation
in the very earliest stages of active immuno-
lin synthesis whereas those used in other
es were immunologically mature.

SPECIFIC BIOLOGIC EFFECTS OF INTESTINAL
GLUCAGON-LIKE MATERIALS. *(E.)* Gutman,
; Fink, G.; Voyles, N.; Selawry, H.; Penhos,
; Lepp, A.; Recant, L. (VA Hosp., Washington,
D.C.). *J. Clin. Invest.* 52(5):1165-1175, 1973.

Rat intestinal extracts were prepared and filtered on Sephadex G-50 columns eluted in 0.02 M ammonium carbonate buffer pH 8.8. Two peaks of glucagon-like immunoreactivity extracts (I, II) were consistently found, and the *in vitro* effects of these peaks on 2 biological systems were tested: (*a*) immunoreactive insulin release by rat pancreas pieces, and (*b*) free fatty acid release and 3', 5'-cyclic AMP levels in adipose tissue. Both peaks increased immunoreactive insulin release in the absence of glucose and also enhanced the glucose effects. Antiglucagon antibody suppressed only peak II activity. Both peaks increased free fatty acid release and 3'5'-cyclic AMP levels in adipose tissue. Only peak II activity was suppressed by antibody. These findings support a specific immunoreactive insulin-releasing and lipolytic action for Peak II glucagon-like immunoreactivity extract.

5099 AUTORADIOGRAPHIC STUDIES ON THE MODE OF GROWTH IN JEJUNAL CRYPT CELLS OF THE MOUSE.
(E.) Maurer, W.; Schultze, B.; Schmeer, A. C.; Haack, V. (Inst. Med. Radiology, Univ. Wurzburg, Germany). *J. Microsc. (Oxf.)* 96(2):181-189, 1972.

Cell kinetic parameters of the jejunal crypt epithelia of male NMRI mice were reinvestigated to determine if a steady state system with constant frequency distribution of cells throughout the cycle exists and if all cells which are labeled after an injection of ^{3}H-thymidine subsequently divide. ^{3}H- and ^{14}C-thymidine double labeling experiments indicated that the cell flux into and out of S-phase is equal and are a direct experimental proof of the existence of a steady state. A generation time of 14 hr was obtained by a ^{3}H- and ^{14}C-thymidine double labeling modification of the percent labeled mitoses method and a proliferative pool size of 75% determined. A mitotic time of 0.5 hr was calculated. This time is highly significant in considering the question of synthesis of metabolic DNA. Such a suggestion would be supported only if the mitotic time in the jejunum were about 1 hr, which is longer than these results indicate. If the 0.5 hr time factor is verified, it would indicate that all labeled cells in the crypt belong to the proliferative pool.

5100 HORSERADISH PEROXIDASE TRACER STUDIES IN THE INTESTINE IN EXPERIMENTAL CHOLERA.
(E.) Yardley, J. H.; Brown, G. D. (Johns Hopkins Univ. Sch. Med., Baltimore, Md.) *Lab. Invest.* 28(4):482-493, 1973.

Isolated loops of small intestine prepared in rabbits were exposed to enterotoxin derived from *Vibrio cholerae* organisms, and a second control loop in each animal was exposed to heat-inactivated cholera toxin. When fluid secretion from toxin-exposed loops was copius, the rabbits were given horseradish peroxidase either i.v. or into the loops. Samples of small intestine were taken simultaneously from experimental and control sites at various times thereafter for light and electron microscopic study of the distribution of horseradish peroxidase. By light microscopy, most samples of choleraic (toxin-exposed) intestine from animals given horseradish peroxidase i.v. showed a mucosal capillary bed that was more dilated and prominent ("opened up"), especially in the upper villi, than in control specimens. There was also greater escape of horseradish peroxidase into the lamina propria in the choleraic loops. No new or abnormal pathways for escape of horseradish peroxidase from capillaries or movement through the tissues, including the epithelium, could be demonstrated by electron microscopy following exposure to cholera toxin. Results obtained after intraluminal horseradish peroxidase were indistinguishable in experimental and control material by both light and electron microscopy. Horseradish peroxidase was taken up by the brush border and by goblet cells but did not penetrate the epithelial layer. The observations suggest that choleraic fluid secretion is not the result of injury to the mucosa or its vasculature but is instead an exaggerated form of normal secretion from the small intestine. A direct effect of cholera toxin could cause mucosal capillary dilation and thereby the enhanced escape of horseradish peroxidase. It is felt, however, that the changes were more likely indirect and related secondarily to heightened secretion from the epithelium. Findings in animals exposed to intraluminal horseradish peroxidase may indicate routes by which cholera toxin reaches effector sites.

5101 ROLE OF THE SMALL INTESTINE IN CHOLESTEROL METABOLISM. *(E.)* McIntyre, N.; Isselbacher, K. J. (Royal Free Hosp., London, England) *Am. J. Clin. Nutr.* 26(6):647-656, 1973.

5102 RADIOPROTECTIVE EFFECT OF GLUTATHIONE ON FATAL RADIATION-INDUCED INTESTINAL DAMAGE. *(Jap.)* Urano, M.; Tanaka, N.; Eto, T. (Kyoto Prefectural Univ. Med., Japan). *Nippon Acta Radiol.* 32(3):324-326, 1972.

5103 MAGNESIUM ABSORPTION AND SECRETION ALONG THE GASTROINTESTINAL TRACT OF THE CHICKEN. *(E.)* Guenter, W.; Sell, J. L. (Animal Sci. Dept., North Dakota State Univ., Fargo). *J. Nutr.* 103(6): 875-881, 1973.

5104 MECHANISM OF INTESTINAL RADIOSENSITIZATION BY ACTINOMYCIN D. *(E.)* Hagemann, R. F.; Concannon, J. P. (Allegheny Gen. Hosp., Pittsburgh, Pa.). *Br. J. Radiol.* 46(4):302-308, 1973.

5105 ORTHOTOPIC TOTAL SMALL BOWEL TRANSPLANTATION IN THE RAT. *(E.)* Kort, W. J.; Westbroek, D. L.; MacDicken, I.; Lameijer, L. D. F. (Med. Fac. Rotterdam, Netherlands). *Eur. Surg.* 5(2):81-89, 1973.

5106 EFFECT OF 180 McV PROTON OR ^{60}Co GAMMA RADIATION ON THE INCORPORATION OF ^{125}I-IODO-2'-DEOXYURIDINE INTO INTESTINAL AND SPLENIC DEOXYRIBONUCLEIC ACID OF MICE. *(E.)* Johanson, K. J.; Larsson, B. (Dept. Radiation Biol., G. Werner Inst., Univ. Uppsala, Sweden). *Acta Radiol.* 11(5):452-464, 1972.

5107 METABOLISM OF HORMONES, DRUGS AND OTHER SUBSTANCES BY THE GUT. *(E.)* Hartiala, K. (Univ. Turku, Finland). *Physiol. Rev.* 3(4):496-534, 1973.

See also, 4960, 4978, 5082.

GENERAL

5108 STUDIES OF THE EFFECTS OF BLOCKAGE OF INTESTINAL LYMPHATICS. I. EXPERIMENTAL PROCEDURE AND STRUCTURAL ALTERATIONS. *(E.)* Danese, C. A.; Georgalas-Penesis, M.; Kark, A. E.; Dreiling, D. A. (Mt. Sinai Sch. Med., New York, N.Y.). *Am. J. Gastroenterol.* 57(6):541-546, 1972.

Lymphatic channels were blocked by injection of an acrylic monomer with catalyst in 3 groups of dogs: in group 1, the lymphatics of a 2-foot segment of proximal jejunum distal to the ligament of Treitz; in group 2 a 4-foot segment of proximal jejunum; and in group 3, all lymphatics of the entire small bowel from the duodenojejunal junc-

n to the ileocecal region. Two of a total of
nimals in groups 1 and 2 and 2 of 4 animals in
up 3 survived for the duration of the experi-
t. All animals of groups 1 and 2 had some
ree of edema, but anastomatic pathways to
acent mesenteric lymphatics developed and the
ma of the bowel disappeared completely 14 weeks
er the lymphatic blockade had been established.
the 2 surviving dogs, the intestine appeared
mal at 1 yr after blockade. Hematoxylin and
in stains showed no abnormalities in the in-
tinal wall. In group 3 dogs, edema was more
ious initially and still present at the end of
year in the 2 surviving dogs. Hematoxylin and
in stains of the jejunum showed blunting and
e thickening of the villi, submucosa, and in-
muscular lymphatics without inflammatory changes.
asionally, a thickening of the lamina propria
n an incrased in cellularity was observed.
ults indicate that complete block of the mesen-
ic lymphatics can be achieved by simple ob-
ation with a nonreactive compound (i.e., an
ylic monomer solution with catalyst). No
osal ulcerations or granulomata were seen.

) BILE ACID AND CHOLESTEROL EXCRETION WITH CARBOHYDRATE-RICH DIETS. *(E.)* Whyte,
I.; Nestel, P. J.; Pryke, E. S. (John Curtin Sch.
Res., Canberra, Australia). *J. Lab. Clin. Med.*
):818-828, 1973.

influence of dietary carbohydrate on cholesterol
bolism was studied in 4 healthy male volunteers,
18-20 yr. Diets rich in sucrose were compared
diets enriched with polyunsaturated or saturat-
atty acids. The plasma cholesterol concentra-
was always less with polyunsaturated fatty acids
with sucrose and highest with saturated fatty
s. Plasma triglyceride levels were always
ed with sucrose. Endogenous neutral steroid
bile acid excretion was measured by the isotopic
ol balance technique after the cholesterol pools
been labeled with radiocholesterol. In compari-
with the fat diets, sucrose induced a clear
ease in bile acid excretion and a reciprocal
ction in neutral steroid excretion so that the
all sterol balance was unchanged. Only minor
ges were seen in the flux of cholesterol between
ma and tissues, as inferred from changes in the
ction of the plasma-specific radioactivity
es. The biliary flux of cholesterol and bile
s was measured in 2 additional subjects during
s rich in carbohydrate or fat. Small volumes
uodenal contents were aspirated at a constant
for 24 hr, the mass of cholesterol and bile
s was measured, and their dilution within the
enal fluid was corrected from the dilution of
ntinuously infused marker. The enterohepatic
ulation of both cholesterol and bile acids was
times greater with the fat than the carbohydrate
. Since the fecal excretion of bile acids was
within the fat diets, the reabsorption of bile
s must have been greater. By contrast, low-fat-
-carbohydrate diets probably led to less effi-
reabsorption of bile acids, thus stimulating
roduction of new bile acids.

5110 EARLY CHANGES IN LIGHT-IRRADIATED SOLUTIONS OF BILIRUBIN: A SPECTROPHOTOMETRIC ANALYSIS. *(E.)* Davies, R. E.; Keohane, S. J. (Temple Univ. Health Sci. Ctr., Philadelphia, Pa.). *Photochem. Photobiol.* 17:303-312, 1973.

Early changes in irradiated solutions of bilirubin were evaluated by spectrophotometric techniques. By absorbance difference spectroscopy, the photoproducts formed in solutions of bilirubin combined with human serum albumin were found to differ from those formed in naturally or artificially jaundiced rat serum, bovine serum albumin solutions, or chloroform or carbon tetrachloride solutions. With a technique based on variable path-length compensation for bilirubin loss (compensated absorbance difference spectroscopy) the approximate shapes of photoproduct absorption spectra could be evaluated. Chloroform and bovine serum albumin solutions produced single-peaked products absorbing at slightly shorter wavelengths than bilirubin. Human serum albumin solutions produced a twin-peaked chromophore absorbing most strongly near 490 nm. These results intensify the doubt concerning the relevance of either *in vitro* organic systems or animal models to the irradiated human infant.

5111 DEACTIVATION OF CHOLERA TOXIN BY A SIALIDASE-RESISTANT MONOSIALOSYLGANGLIOSIDE. *(E.)* King, C. A.; van Heyningen, W. E. (W. Dunn Sch. Path., Univ. Oxford, England). *J. Infect. Dis.* 127(6):639-647, 1973.

5112 PROSTAGLANDINS AND THE GASTROINTESTINAL TRACT. *(E.)* Bennett, A. (King's Coll. Hosp. Med. Sch., London, England). *Acta Hepato Gastroenterol.* 20(2):93-97, 1973.

5113 INACTIVATION OF GASTRIN II BY RAT TISSUE HOMOGENATES HUMAN SERUM AND LIVER AMIDASES. *(E.)* Seelig, H. P.; Muller, U.; Linthe, H. (Dept. Path., Berlin Free Univ., Germany). *Acta Hepato Gastroenterol.* 20(2):142-149, 1973.

5114 SUCCESSFUL PRESERVATION OF CANINE SMALL INTESTINE BY FREEZING. *(E.)* Hamilton, R.; Holst, H. I.; Lehr, H. B. (Univ. Pennsylvania Sch. Med., Philadelphia). *J. Surg. Res.* 14(4):313-318, 1973.

5115 BASIS OF THE DEFECT IN α-1-ANTITRYPSIN DEFICIENCY. *(E.)* Bell, O. F.; Carrell, R. W. (Biochem. Dept., Lincoln Coll., New Zealand). *Nature* 243(5407):410-411, 1973.

5116 THE NATURE OF THE ADENOSINE TRIPHOSPHATASE ACTIVITY OF RUMEN EPITHELIUM. *(E.)* Mooney, P.; O'Donovan, D. J. Dept. Physiology, Univ. Coll., Galway, Irish Republic). *Biochem. Soc. Trans.* 1(1):269-270, 1973.

5117 PULSE RADIOLYSIS AND INACTIVATION OF TRYPSIN. *(E.)* Ovadia, J. (M. Reese Hosp., Chicago, Ill.). *Isr. J. Chem.* 10(6):1067-1077, 1972.

5118 A NOTE ON STABILITY STUDY OF PEPSIN ACTIVITY UNDER DIFFERENT CONDITIONS IN LIQUID PREPARATIONS. *(E.)* Maitra, N.; Choudhury, A. (Pharmaceutical Lab., Calcutta Chem. Co. Ltd., Calcutta). *J. Inst. Chem. (Calcutta)* 44(Part 6): 213-215, 1972.

5119 REGENERATION OF PARIETAL AND VISCERAL PERITONEUM. A LIGHT MICROSCOPICAL STUDY. *(E.)* Raftery, A. T. (Sch. Med., Univ. Leeds, England). *Br. J. Surg.* 60(4):293-299, 1973.

5120 MITOTIC ACTIVITY OF PERITONEUM IN CONTACT WITH A REGENERATING AREA OF PERITONEUM. *(E.)* Watters, W. B.; Buck, R. C. (Dept. Anatomy, Univ. Western Ontario, London, Canada). *Virchows Arch [Zellpathol]* 13(1):48-54, 1973.

See also, 5080.

DIAGNOSTIC PROCEDURES

21 SPLENIC UPTAKE OF ^{99m}TECHNETIUM SULPHUR
COLLOID AS AN INDEX OF PORTAL HYPERTENSION.
.) Gourgoutis, G. D.; Das, G.; Lindsay, N. (Med.
rv., VA Ctr., Dayton, Ohio). *Am. J. Gastroenterol.*
(5):435-442, 1972.

patic scintiscanning with ^{99m}technetium sulfur
lloid was carried out in 34 male patients (aged
-75 yr) with advanced liver disease. Of the 34,
patients suffered from Laennec's cirrhosis. In
of 14 patients with wedged hepatic vein pressure
asuring less than 18 mm Hg, the ratio of splenic-
atic peak uptake was 30% or less. In 19 of
patients with wedged hepatic vein pressure great-
than 18 mm Hg, the values of the splenic isotope
ake, though higher than 30%, do not directly re-
t the pressure measurements. Therefore, a peak
enic uptake of 30% or more can be used to
arate patients with modest portal hypotension of
mm Hg or less from those with portal pressure
ve this level. It is suggested that the splenic
ake of the radioisotope during hepatic scinti-
nning reflects the extent of diminished effective
atic flow, as well as intrahepatic and extra-
atic shunts, rather than measurements of por-
pressure at any given time.

2 REVERSED SERUM LECITHIN: CHOLESTEROL
RATIOS IN RELATION TO GALLSTONE FORMATION
A POSSIBLE AID TO DIAGNOSIS. *(E.)* Stott, A. W.;
ffin, T. F. R. (Scarborough Group of Hosp.,
kshire, England). *Br. J. Clin. Pract.* 27(3):
90, 1973.

ords of 139 patients (102 women and 37 men) with
ven gallstones were reviewed. When the mean ser-
ecithin values for specific age groups of those
gallstones were compared with similar age
ps of control subjects, it was obvious that the
thin values for gallstone patients were lower
ll decades of life. Similar comparisons re-
ed that the mean serum cholesterol values for
decade were higher among gallstone patients.
combination of these factors resulted in a re-
ed mean cholesterol: lecithin ratio in gall-
e patient age groups in comparison with normal
rol age groups. The cholesterol increase may
ue to overproduction by the liver cells because
ailure or impairment of the regulating mechanism.
fall in serum lecithin may reflect a reduction
iver lecithin production brought about by the
nished bile-salt pool found in gallstone patients.
significant difference between the serum choles-
l:lecithin ratios of gallstone patients and nor-
subjects may be useful in diagnosing potential
stone formers with as yet no visible signs of
es.

MEASUREMENT OF THE RATE OF STOMACH EMPTY-
ING USING INDIUM-113M AND A 10-CRYSTAL
ILINEAR SCANNER. *(E.)* Coates, G.; Gilday,
.; Cradduck, T. D.; Wood, D. E. (Toronto Gen.
., Canada). *Can. Med. Assoc. J.* 108:180-183,
.

Indium-113m and a 10-crystal rectilinear scanner were used to measure stomach emptying rates in 10 normal healthy adults and 7 patients (3 men and 4 women, aged 42-60 yr) with gastrointestinal diseases, including duodenal ulcer, prepyloric ulcer, and hiatus hernia. The technique is simple and the results reproducible. In normal individuals the curves obtained showed an initial plateau or even a slight rise in activity up to 20 min, followed by a rapid step-like fall in counts. The activity diminished in the stomach at a rate of 425-1600 counts/min. The normal T50% (time for half the activity to leave the stomach) was 42-95 min, and the relation between counts and time was, to first approximation, a linear function. Of the 7 patients, 6 underwent gastroscopy. The 3 who were considered to have no stomach pathology on gastroscopic and radiographic examinations had normal T50% values. The 3 who showed retention on gastroscopy had abnormally slow emptying rates. An injection of urocholine (3 mg s.c. 15 min before the study) increased the emptying rate. It is suggested that this method is particularly useful in evaluating the results of drug therapy in patients with gastric retention.

5124 CERULOPLASMIN AS A PROGNOSTIC TEST IN INFECTIOUS HEPATITIS. *(Rum.)* Feticu, M.; Gavrila, I.; Negomireanu, T. (Inst. Med. Pharm., Cluj, Rumania). *Cluj. Med.* 45(1):73-80, 1972.

Serum ceruloplasmin levels were determined at various times on 171 patients, aged 20-60 yr, with various liver diseases. These included common infectious hepatitis (85), common infectious hepatitis treated with cortisone (15), prolonged infectious hepatitis (6), severe infectious hepatitis treated with cortisone (24), infectious hepatitis developing into chronic hepatitis (14), chronic progressive hepatitis (15), hepatic dystrophy (6), and cirrhosis (6). Most ceruloplasmin values were increased to 450-650 U. Ceruloplasmin curves from patients with the common form of infectious hepatitis were flat with levels gradually decreasing to normal. Reduced ceruloplasmin levels were consistently found in patients with severe liver disease, i.e., severe infectious hepatitis with a lethal outcome, decompensated cirrhosis, and chronic progressive hepatitis. Cortisone therapy reduced ceruloplasmin to levels similar to those found in severe liver disease. These findings imply that lower ceruloplasmin levels found at the onset of infectious hepatitis indicate that the course will be severe.

5125 PREOPERATIVE ANGIOGRAPHY IN THE ZOLLINGER-ELLISON SYNDROME. *(E.)* Giacobazzi, P.; Passaro, Jr., E. (Wadsworth Hosp. VA Ctr., Los Angeles, Calif.). *Am. J. Surg.* 126(1):74-76, 1973.

Selective angiography was performed preoperatively on 6 patients with evidence gastrin-producing tumors. In 1 patient angiographic signs consistent with a tumor were seen, but no tumor was found at operation or at autopsy. However, a gastrinoma had been removed from this patient 4 yr earlier and this may have caused the false-positive angiogram. In the 1 patient with a true positive angiogram, a nodule was found in the pancreas. Of the 4 patients with negative angiograms, 1 had no tumor after extensive search at 2 separate at operation; 1 had tumor tissue located in the pancreas, duodenum, and local lymph nodes; and the last had metastatic tumor in lymph nodes adjacent to the pancreas, even on biopsy. Despite the relatively low yield of definitive results, it is suggested that patients with the Zollinger-Ellison syndrome be subjected to preoperative mesenteric angiography to locate the occasional case in which simple removal of the tumor, rather than total gastrectomy, would be sufficient.

5126 DIAGNOSIS OF BARRETT'S ESOPHAGUS BY PERTECHNETATE SCINTIGRAPHY. *(E.)* Berquist, T. H.; Nolan, N. G.; Carlson, H. C.; Stephens, D. H. (Mayo Grad. Sch. Med., Rochester, Minn.). *Mayo Clin. Proc.* 48(4):276-279, 1973.

A new diagnostic tool based on the principle of selective concentration of technetium-99m [^{99m}Tc] pertechnetate by the ectopic gastric mucosa was used in the identification of Barrett's esophagus and Barrett's ulcer. A 69 yr old male was hospitalized with dysphagia of 8 months duration. Fluoroscopic examination demonstrated an esophageal stricture at the junction of the middle and lower thirds of the esophagus, suggestive of a benign lesion. Esophageal scanning with [^{99m}Tc] pertechnetate revealed abnormal extension of radioactivity from the stomach up into the thorax to the level of stricture. At operation, biopsy specimens showed that benign stratified squamous epithelium existed above the level of stricture and that gastric type columnar lining was present below this level. It is suggested that the specificity of the method is so high that the need for confirmation of diagnosis by biopsy may no longer be needed.

5127 CORRELATION BETWEEN GASTROSCOPIC AND DIRECT VISION BIOPSY FINDINGS. *(E.)* Cronstedt, J. L., Simson, I. W. (Dept. Internal Med., Univ. Pretoria, South Africa). *Gastrointest. Endosc.* 19(4):174-175, 1973.

Biopsies were taken from 78 cases with endoscopically normal mucosa, representing corpus mucosa (58 cases), antrum mucosa (18), and mucosa from the corpus antrum transition zone (2). The histological picture was normal with no edema and very few inflammatory cells in 74% of the corpus biopsies. A normal antrum mucosa was found in only 56% of the antrum biopsies. Various degrees of gastritis were found in the remaining cases. Atrophic gastritis was shown in 3 antrum biopsies. Thus the endoscopic impression of normal mucosa was histologically verified in only 68% of the cases. Histological gastritis with edema and increased inflammatory cells was shown in 87% of 90 cases of endoscopically diagnosed corpus gastritis with a normal mucosa in the remaining 13%. Corresponding figures for 27 cases of endoscopically diagnosed antral gastritis were 82% and 18%, resp. Histologic atrophy with or without intestinal metaplasia was shown in 79% of 48 cases with endoscopic signs of mucosal atrophy. Inflammatory changes without signs of atrophy were seen in 15% and 6% showed histologically normal mucosa. Marginal biopsies from 92 cases of ulcerated lesions endoscopically diagnosed as benign ulcers showed only gastritis with or without atrophy in 64% of the cases with normal mucosa found in 3% and in 1 case, malignant lymphoma was unexpectedly demonstrated. In 33 cases of endoscopically diagnosed and later verified gastric malignancies, biopsy revealed the malignant nature of the lesion in 26 cases (79%). It is emphasized that a negative biopsy does not exclude malignancy. Of 13 cases of polypoid lesions, only 3 biopsy specimens revealed the histological nature of the lesion; all were benign adenomatous polyps. Normal mucosa or gastritis were shown in the remaining 10 cases.

5128 ACCUMULATION OF IONIC ^{67}GA IN EMPYEMA OF THE GALLBLADDER. *(E.)* Lomas, F.; Wagner, Jr., H. N. (Johns Hopkins Med. Inst., Baltimore, Md.). *Radiology* 105(3):689-692, 1972.

Inflammation of the gallbladder was correctly diagnosed and the site, shape, and size of the inflammed area determined in 4 cases using ^{67}Ga imaging. In the 4 patients (2 men and 2 women, aged 54-64 yr), the classical symptoms were lacking. A history of pancreatitis, duodenal ulcer, partial biliary obstruction, and cholecystitis coexisted in 1 patient. Each patient received ^{67}Ga-citrate (3mCi,i.v.), and images of the gallbladder region were obtained with a scintillation camera. In each case, more ^{67}Ga accumulated in the inflammed area than in the adjacent liver. It may be impossible to distinguish between tumor and abscess as related to the pattern of increased ^{67}Ga uptake, but these conditions are readily distinguishable clinically. In 2 cases of amebic abscess, no uptake of ^{67}Ga occurred in the lesions, suggesting this uptake in inflammatory lesions may depend on the type of inflammatory response. Concentrations of ^{67}Ga adequate for imaging occur as early as 18 hr after injection.

5129 DIFFERENTIAL DIAGNOSIS OF GASTRIC ULCERATIVE LESIONS BY GASTROPHOTOGRAPHY. *(Por.* Nakadaira, A. (Marilla Fac. Med., Sao Paulo, Brazil) *Rev. Hosp. Clin. Fac. Med. Sao Paulo.* 27:93-106, 1972.

Diagnoses of ulcerative lesions of the stomach, established by gastrophotography and histopathological methods, were compared in 42 patients (33 men and 9 women, aged 25-78 yr). These patients were selected from 204 patients with gastric lesions on the basis of (1) high-quality gastrophotography, permitting a detailed examination; (2) histopatho-

gical diagnosis made on a biopsy taken at surgery;
d (3) diagnosis confirmed by examination of a
opsy obtained with a fiber gastroscope. Malignant
sions were diagnosed in 20 and peptic ulcers in
of these 42 patients. Gastrophotographic diag-
sis was correct in all 20 patients with cancer,
cluding 2 with preinvasive carcinomas, and in 15
the 22 patients with peptic ulcer; findings were
ggestive of neoplastic lesions in 7 patients with
otic ulcer. Statistical analysis showed that the
llowing signs were significant in characterizing
lignant lesions: (1) infiltration of adjacent
cosa, (2) raised ulcer borders, (3) irregular
cer fundus, (4) absence of edema in the borders,
irregular shape, and (6) effacement of mucosal
ds at a distance from the ulcer. Significant
ns characteristic of benign ulcers were: (1)
l-defined borders, (2) absence of islets of
osa in the ulcer's interior, and (3) absence of
rginal erosion. These signs, although valid for
s particular group, cannot be extrapolated to
general population.

30 BIOCHEMICAL TESTS IN EVALUATION OF LIVER FUNCTION.

(E.) Skrede, S.; Blomhoff,
P.; Elgio, K.; Gjone, E. (Univ. Hosp., Oslo,
way). *Scand. J. Gastroenterol.* 8(S 19):
46, 1973.

ords of 130 patients were reviewed to determine
value of biochemical tests for classification
liver diseases. The highest values of the trans-
nases were found in acute hepatitis and active
onic hepatitis. In chronic persistent hepa-
is, biliary cirrhosis, or cryptogenetic cirrho-
, these values were usually only slightly ele-
ed. The most sensitive indicator of liver dam-
was ornithine carbamoyltransferase. However,
lutamyltranspeptidase was a sensitive indicator
n bile obstruction was present, and may be of
ticular value in alcoholic liver disease. In
of the acute hepatitis cases, serum iron was
reased. In acute liver injury, albumin concen-
tion was not suitable for the evaluation of
tein synthesis. Proteins with a more rapid
nover rate should be used instead. The Thrombo-
t or Normotest for coagulation compared reasonab-
well with prealbumin concentrations in alcoholic
cryptogenetic cirrhosis. This was also true for
te hepatitis, but not in conditions with biliary
truction as a prominent feature. The Thrombotest
lowered in more than 50% of cases with low pre-
umin concentrations and much lowered in 2 patients
n hepatoma and 1 patient with carcinoma of the
creas. Normotest values were disproportionately
n in biliary obstruction while the Thrombotest
el corresponded fairly well to the concentration
lbumin and prealbumin as was also true for cryp-
enetic or alcoholic cirrhosis. The α-lipoprotein
centration was an equally sensitive test of pro-
n synthesis as prealbumin. In alcoholic cirrhosis
steatosis, the nonesterified fatty acid concen-
tion was higher than in other diagnostic groups.
holism should be considered a possible cause when-
a type IV pattern is revealed by lipoprotein an-
is. In obstructive jaundice, an abnormal lipo-
ein, LP-X, frequently occurred. Intrahepatic and
extrahepatic cholestasis may be distinguishable by the combined estimation of LCAT and LP-X. IgG levels were highest in chronic active hepatitis; IgM increased moderately in most acute hepatitis cases, but had highest values in primary biliary cirrhosis. IgA was most increased in alcoholic cirrhosis. In steatosis, only immunoglobulins belonging to this class were increased.

5131 THE PROGNOSTIC VALUE OF LABORATORY TESTS IN LIVER DISEASE.

(E.) Tygstrup, N. (Univ. Hosp., Copenhagen, Denmark). *Scand. J. Gastroenterol.* 8(S 19):47-50, 1973.

Records for 500 cirrhosis patients were analyzed for relations between data observed at the time of diagnosis and the survival time of the patients. No histological changes were noted which divided the cases into groups with significantly different survival times. In an evaluation of records for 20 patients surviving more than 3 yr and 20 patients surviving less than 3 months, 5 tests were found useful for separating groups with such significantly different survival rats. The tests, most of which reflected synthesis of liver-generated proteins, were serum bilirubin, alkaline phosphatase, prothrombin time, serum albumin, and prothrombin time and serum albumin combined. It is thus suggested that survival time in cirrhosis depends on the ability of the liver to perform normal metabolic processes. Serum albumin and prothrombin concentrations, valuable tests for cirrhosis, were of no prognostic significance in a series of 24 patients with acute fulminant liver failure due to viral or toxic hepatitis. Serum bilirubin was significantly higher in patients who died as a result of acute liver failure. Galactose elimination capacity was also a useful indicator, with only 1 of 15 patients with elimination rates lower than 1 mmol/min surviving, against 5 of 7 above this limit; the 2 of the 7 who died did so from extrahepatic causes. Combining data from bilirubin concentration and galactose elimination capacity tests did not improve prognostic discrimination essentially. Prognostication of liver disease from laboratory values remains difficult and uncertain.

5132 THEORY AND EXPERIENCE BEHIND THE USE OF COAGULATION TESTS IN DIAGNOSIS AND PROGNOSIS OF LIVER DISEASE.

(E.) Koller, F. (Canton Hosp., Basel, Switzerland). *Scand. J. Gastroenterol.* 8(S 19):51-61, 1973.

The half-life of plasma albumin is too long for a measure of plasma albumin content to be of value in determining the severity of acute liver failure. Serum bilirubin and SGPT values do not clearly correlate with the severity of hepatitis. The Quick values show a better correlation and patients with a value below 30% are usually in hepatic coma. The total of clotting factors II, V, and VII correlates even more accurately with the severity of acute liver damage. If the total is below 70-80, the patient may go into coma. However, in both the Quick and the total II, V, and VII factors evaluations it is impossible to distinguish hepatic coma patients who will survive from those who will not. In 3 male patients (aged 34-50 yr) with acute liver failure, the clotting factors were very low and, despite the normal appearance of other diagnostic tests, each patient went into hepatic coma, from which 1 did not recover. In a 4th case (a 53 yr old male), endogenous hepatic coma was ruled since the Quick value was 50% and the total of factors II, V, and VII was 123. If vitamin K administration is able to check the decline in clotting factors, it can usually be assumed that sever liver damage has not yet occurred. Clotting factor VIII behaves differently in that it does not decrease in severe liver disease and may even increase. It is the only factor which is synthesized outside the liver, which may account for its failure to decrease in severe liver damage. Excessive activity of the reticulo-endothelial system in liver disease may explain an increase in the synthesis of this particular clotting factor. The relatively uncommon shortening of the euglobulin lysis time in liver disease is indicative of isolated fibrinolysis, which may be treated by epsilon-animo-caprioc acid. The cause of increased fibrinolytic activity of plasma may be lack of normal clearance of the blood activator of the fibrinolytic system. This activator is usually eliminated by the liver. Its accumulation in the plasma activates fibrinolysis. The usual reduction of antithrombin III seen in liver disease, coupled with the increase in factor VIII, favors thrombosis.

5133 NORMOTEST IN ACUTE HEPATITIS AND CHRONIC LIVER DISEASE. *(E.)* Ockerman, P. A.; Braconier, J. H.; Eriksson, O. (Univ. Hosp., Lund, Sweden). *Scand. J. Gastroenterol.* 8(S 19): 83-91, 1973.

Blood coagulation factors II, VII, and X were assayed with Normotest in 170 patients with acute hepatitis, about 1/3 of whom had serum hepatitis and the rest acute infectious hepatitis or hepatitis of uncertain genesis. Also studied were 64 patients (33 males and 31 females, aged 9-83 yr) with chronic liver disease of whom 53 had cirrhosis (18 of alcoholic type, 5 with hypertension of the portal vein, 5 with chronic aggressive hepatitis, and 25 without definite cause); 2 had adipose degeneration on alcoholic basis and 9 had chronic persistent hepatitis. In hepatitis, Normotest values decreased during the height of the disease, but normalized rapidly thereafter and in most cases earlier than the alanine aminotransferase activity of serum. Normalization of Normotest values indicated that the alanine aminotransferase values would also soon decrease. In the patients with chronic liver disease, biopsy was used as a diagnostic reference method. The BSP tolerance test, a comparatively laborious method with some risk of complications, was as expected the best single chemical test to indicate the abnormality of liver function. Among the simple chemical tests, Normotest, abnormal in 66% of the cirrhosis patients, rated among the best together with alanine and aspartate aminotransferase and γ-globulin. In 20% of the chronic liver disease patients, Normotest was the only chemical test, in addition to the BSP tolerance test, that indicated pathological values.

5134 COAGULATION FACTORS AS INDICATORS OF PROTEIN SYNTHESIS IN CHRONIC LIVER DISEASE. *(E.)* Ritland, S.; Skrede, S.; Blomhoff, J. P.; Gjone, E. (Rikshops., Oslo, Norway). *Scand. J. Gastroenterol.* 8(S 19):113-117, 1973.

In 43 patients with chronic liver disease, Normotest (NT) and Thrombotest (TT) levels were compared with serum albumin and prealbumin concentrations. Chronic hepatitis occurred in 17 patients, many of whom were on corticosteroid and/or immunosuppressive therapy; in 9; alcoholic cirrhosis in 4; cryptogenetic cirrhosis in 6; protracted acute hepatitis in 2; extrahepatic cholestasis in 1; amyloidosis of the liver in 1; hepatic cysts in 1; hyperbilirubinemia in 1; and uncertain diagnosis in 1. Vitamin K deficiency or disseminated intravascular coagulation was not present. Mean NT values were decreased in chronic hepatitis and in alcoholic or cryptogenetic cirrhosis. In contrast, the NT levels were increased in biliary cirrhosis. The albumin concentration was decreased in about 50% of all patients, whereas the prealbumin levels were decreased in about 80%. TT and NT showed a highly significant correlation with prealbumin. Highly significant correlation between TT and albumin was also found, whereas the correlation between NT and albumin was not significant.

5135 USE OF NORMOTEST AND THROMBOTEST, COAGULATION TESTS IN HEPATOCELLULAR DISEASE. *(E.* Hillenbrand, P.; Sherlock, S. (Roy. Free Hosp., London, England). *Scand. J. Gastroenterol.* 8(S 19): 125-131, 1973.

Normotest and Thrombotest coagulation tests were compared with other biochemical tests to assess their diagnostic and prognostic value in hepatocellular disease. Patients with acute hepatitis (14 males and 18 females, aged 8-70 yr), acute hepatic failure (10 males and 20 females, aged 8-78 yr), active chronic hepatitis (5 males and 15 females, aged 12-75 yr), and cirrhosis (42 males and 14 females, aged 18-69 yr) were studied. Twenty-eight of the acute hepatitis patients had viral hepatitis and 4 had had repeated halothane anaesthetics. Liver failure was due to viral hepatitis in 12 patients, acute fatty liver of pregnancy in 7, halothane in 6, paracetamol overdose in 3, carbon tetrachloride poisoning in 1, and hypersensitivity to iproniazid in 1. Cirrhosis was alcoholic in 28 patients, cryptogenic in 21, and post-hepatic in 3; 2 patients had primary liver cell cancer and 2 the Budd-Chiari Syndrome. In acute hepatitis, Normotest and Thrombotest returned to normal before most other biochemical test, indicating good synthetic function of the liver cells. Serum bilirubi and aspartate transaminase were the last tests to return to normal values. Normal coagulation tests did not exclude progression to chronic liver diseas In acute hepatic failure, the coagulation tests wer

e best prognostic index. Normotest gave similar
ults to Thrombotest in all groups of patients.

36 THE DIAGNOSTIC VALUE OF COAGULATION STUDIES IN CHRONIC LIVER DISEASE. *(E.)*
ltkamp, J. J.; Kreuning, J. (Div. Hemostasis and
rombosis Res., Acad. Ziekenhuis, Leiden, The
therlands). *Scand. J. Gastroenterol.* 8(S 19):
-95, 1973.

rious clotting tests were performed on samples
om 96 patients with chronic liver disease includ-
g cirrhosis proven by biopsy (44), cirrhosis
agnosed on biochemical evidence only (17),
ronic persistent and aggressive hepatitis (21),
l steatosis hepatis (14). The tests used were
thrombin time, Factor V, Normotest, Thrombotest
rve and fibrinogen. In the steatosis group no
agnostic contribution was made by these clot-
g tests. A significantly abnormal result
obtained with 1 or more tests in the cirrhosis
l hepatitis groups in 27 of 82 patients. In
atients only 1 test, in 5 patients 2 tests, and
15 patients 3 or more tests were significantly
ormal. The most sensitive tests in this series
e prothrombin time and Normotest.

7 CAPSULE-BIOPSY DX OF INFANTS' INTESTINAL PROBLEMS. *(E.)* Boon, D. J. (Springfield
., Ill.). *Hosp. Phys.* 9(6):24-25, 1973.

3 TRANSDUODENAL VISUALIZATION OF THE BILE AND PANCREATIC DUCTS. *(E.)* Vennes, J.
Fac. Med., U. Minnesota, Minneapolis). *Hosp.*
t. 8(6):117-124, 1973.

ANGIOGRAPHY IN MYOMAS OF THE GASTROINTESTINAL TRACT. *(E.)* Kaude, J.; Silseth,
Tylen, U. (U. Hosp., Lund, Sweden). *Acta*
ol. 12(6):691-703, 1972.

SELECTIVE ANGIOGRAPHY IN FINE-NEEDLE ASPIRATION CYTODIAGNOSIS OF GASTRIC AND
REATIC TUMOURS. *(E.)* Oscarson, J.; Stormby,
Sundgren, R. (Univ. Hosp., Lund, Sweden). *Acta*
ol. 12(6):737-749, 1972.

THE PANCREAS - RADIOGRAPHIC DEMONSTRATION OF PANCREATIC MORPHOLOGY AT AUTOPSY. *(E.)*
in, B.; Kreel, L.; Slavin, G. (Northwick Park
., Harrow, England). *Radiography* 39(462):151-
1973.

GASTROINTESTINAL BLEEDING AND HEPATOMA. DIAGNOSTIC VALUE OF CELIAC ANGIOGRAPHY.
Weinstein, L. D.; Kotzen, L.; Chaney, Jr.,
.; Davis, N. E. (Hackensack Hosp., N.J.). *J.*
Soc. N.J. 70(6):455-457, 1973.

5143 A NEW RADIOPHARMACEUTICAL FOR COMBINED LUNG-LIVER SCAN--PRELIMINARY EXPERIMENT IN ANIMALS. *(E.)* Chaudhuri, T. K.; Chaudhuri, T. K.; Christie, J. H. (Univ. Iowa, Iowa City). *J. Nucl. Med.* 14(6):346-347, 1973.

5144 THE VALUE OF PLASMA GAMMA-GLUTAMYL TRANSPEPTIDASE IN THE DETECTION OF HEPATIC METASTASES. *(E.)* Irvin, T. T.; Edwards, J. P.; Goligher, J. C. (Dept. Surg., Univ. Leeds, England). *Br. J. Surg.* 60(5):347-349, 1973.

5145 INVESTIGATIONS OF ^{18}F-P-FLUOROPHENYLALANINE FOR PANCREAS SCANNING. *(E.)* Cottrall, M. F.; Taylor, D. M.; McElwain, T. J. (Roy. Marsden Hosp., Sutton, Surrey, England). *Br. J. Radiol.* 46(4):277-288, 1973.

5146 BARIUM-WATER DOUBLE CONTRAST ENEMA. *(E.)* Thursfield, W. R. R. (Isle of Wight, Portsmouth Hosp. Groups, England). *Ann. R. Coll. Surg. Engl.* 52(5):320-323, 1973.

5147 STUDIES ON THE DETECTION OF AUSTRALIA ANTIGEN WITH THE AGAR-GEL IMMUNOPRECIPITATION METHODS. *(Jap.)* Oya, S.; Kirimoto, K.; Kagawa, H.; Kurimura, O. (Kure Natl. Hosp., Japan). *Iryo* 26(5):423-427, 1972.

5148 ENDOSCOPIC PANCREATOCHOLANGIOGRAPHY AND COLOSCOPY. *(E.)* Manier, J. W. (Univ. Iowa Coll. Med., Iowa City). *J. Iowa Med. Soc.* 63(5):216-219, 1973.

5149 A NEW COLLOID FOR LIVER TOMOSCINTIGRAPHY. *(E.)* Colombetti, L. G.; Huber, M.; Ravasini, R. (Abbott Lab., Chicago, Ill.). *J. Nucl. Biol. Med.* 16(1):16-20, 1972.

5150 CAVAL-PORTAL SHUNTING AS A CAUSE OF A FOCAL INCREASE IN RADIOCOLLOID UPTAKE IN NORMAL LIVERS. *(E.)* Holmquist, D. L.; Burdine, J. A. (Baylor Coll. Med., Houston, Tex.). *J. Nucl. Med.* 14(6):348-351, 1973.

5151 AN AUTOMATED PASSIVE HAEMAGGLUTINATION TECHNIQUE SUITABLE FOR THE DETECTION OF HEPATITIS B VIRUS ANTIGEN AND ANTIBODY IN BLOOD DONORS. *(E.)* Nelson, M.; Phipps, E. J.; Watson, P. G.; Watts, J. R.; Zwolenski, R. (New South Wales Red Cross Blood Transfusion Service, Technicon Equipment, Sydney, Australia). *J. Clin. Pathol.* 26(5):343-350, 1973.

5152 INTESTINAL BIOPSY IN CHILDHOOD. *(E.)* Townley, R. R. W.; Barnes, G. L. (R. Children's Hosp., Melbourne, Australia). *Arch. Dis. Child.* 48(6):480-482, 1973.

5153 COMPARISON BETWEEN THE PAFS FIXATIVE AND THE MODIFIED TELEMANN METHOD IN THE DIAGNOSIS OF INTESTINAL PROTOZOA IN MAN. *(Sp.)* Torres, P.; Navarrete, N. (Fac. Med., U. Austral, Chile, Valdivia). *Bol. Chile Parasitol.* 27(3-4):90-95, 1972.

5154 RADIOLOGIC MANIFESTATIONS OF MECKEL'S DIVERTICULUM. *(E.)* White, A.F.; Oh, K. S.; Weber, A. L.; James, Jr., A. E. (Harvard Med. Sch., Boston, Mass.). *Am. J. Roentgenol. Radium Ther. Nucl. Med.* 118(1):86-94, 1973.

5155 THE USE OF ^{99m}Tc TO DETECT GASTRIC MALIGNANCY. *(E.)* Marsden, D. S.; Alexander, C. H.; Yeung, P. K.; Dunn, A. A. (Roosevelt Hosp., New York, N.Y.). *Am. J. Gastroenterol.* 59(5):410-415, 1973.

5156 WHY LAPAROSCOPY? *(E.)* Lindner, H. (German Red Cross Hosp., Hamburg, West Germany). *Gastrointest. Endosc.* 19(4):176-179, 1973.

5157 NUCLEAR DNA CONTENT AS A CRITERION OF MALIGNANCY IN SALIVARY GLAND TUMORS OF THE ORAL CAVITY. *(E.)* Eneroth, C.-M.; Zetterberg, A. (Dept. Otolaryngology, Tumour Path., Karolinska Inst., Stockholm, Sweden). *Acta Otolaryngol.* 75(4):296-298, 1973.

5158 THE DIAGNOSIS OF ATROPHIC GASTRITIS. *(E.)* Kirkpatrick, J. R.; Davies, G. T.; Evans, K. T. (Welsh Natl. Sch. Med., Cardiff). *Ann. Clin. Res.* 5(1):39-45, 1973.

5159 "BUBBLY BARIUM" A CARBONATED COCKTAIL FOR DOUBLE-CONTRAST EXAMINATION OF THE STOMACH. *(E.)* Pochaczevsky, R. (Jewish Hosp., Brooklyn, N. Y.). *Radiology* 107(2):461-462, 1973.

5160 SCANNING IN ABDOMINAL TRAUMA. *(E.)* O'Mara, R. E. (VA Hosp., Tucson, Ariz.). *Postgrad. Med.* 53(3):109-113, 1973.

5161 DUODENOSCOPIC PANCREATOGRAPHY. *(E.)* Weiss, H. D.; Anacker, H.; Wiesner, W.; Rupp, N. (Clin.-On-The-Right-of-the-Isar, Munich, Germany). *Radiology* 106(2):333-339, 1973.

5162 FOCAL IATROGENIC INCREASED RADIOCOLLOID UPTAKE ON LIVER SCAN. *(E.)* Helbig, H. D. (Duke Univ. Med. Ctr., Durham, N.C.). *J. Nucl. Med.* 14(6):354-355, 1973.

5163 SURGICAL ASPECTS OF RADIODIAGNOSIS OF THE BILIARY TRACT. *(Ger.)* Rueff, F. L. (Surg. Clin., Univ. Munich, Germany). *Munch. Med. Wochenschr.* 115(21):971-977, 1973.

5164 USEFULNESS OF SOLID MEDIUM IN MYJAK'S APPLICATION (3) FOR CURRENT LABORATORY DIAGNOSIS OF AMOEBIASIS. *(E.)* Kudrewicz, L.; Zwierz, C. (Inst. Marine Med., Gdansk, Poland). *Bull. Inst. Mar. Med. Gdansk* 23(3/4):201-204, 1972.

5165 TIME OF OPTIMAL GALLBLADDER OPACIFICATION WITH TELEPAQUE (IOPANOIC ACID). *(E.)* Whalen, J. P.; Lizzuti, R. J.; Evans, J. A. (New York Hosp.-Cornell Univ. Med. Ctr., N.Y.). *Diagn. Radiol.* 105(3):523-524, 1972.

5166 IMMUNOGLOBULIN THERAPY IN CHILDREN DURING ACUTE AND SUBACUTE DISEASES OF INFECTIOUS ETIOLOGY AFFECTING THE RESPIRATORY AND GASTROINTESTINAL. *(It.)* Papi, N.; Romani, L.; Garofoli, C. (Osp. Bambin Gesu, Rome, Italy). *Minerva Pediatr.* 24(21):876-884, 1972.

5167 DUODENOGRAPHIC RADIOLOGICAL DIAGNOSIS OF THE PAPILLA OF VATER. III. THE PAPILLA OF VATER AND THE PAPILLARY DUODENAL SEGMENT. *(Ger.)* Kamieth, H. (no affil.). *Radiologe* 12(6):193-197, 1972.

5168 THE USE OF SELECTIVE ANGIOGRAPHY IN ACUTE GI BLEEDING. *(E.)* Holton, J. C. (no affil.). *J. Arkansas Med. Soc.* 70(1):60-63, 1973.

5169 USE OF COMPUTER-ASSISTED MODEL IN DIAGNOSI OF DRUG HYPERSENSITIVITY JAUNDICE. *(E.)* Stern, R. B.; Maxwell, J. D.; Knill-Jones, R. P.; Thompson, R. P. H.; Williams, R. (King's Coll. Hosp. London, England). *Br. Med. J.* 2(5869):767-769, 1973.

5170 THE INDIRECT IMMUNOFLUORESCENCE TEST IN THE SIMULTANEOUS DIAGNOSIS OF CHAGAS DISEASE AND TOXOPLASMOSIS. *(Sp.)* Stagno, S.; Saavedr P. (Dept. Microbiol., Parasitology, U. Chile, Santiago). *Bol. Chile Parasitol.* 27(3-4):122-125, 1972

5171 STUDY OF A NEW IMMUNOLOGICAL METHOD FOR THE DIAGNOSIS OF VIRAL HEPATITIS. *(Rus.)* Drobinskii, I. R.; Tsybuliak, S. N.; Botezatu, I. F Chernichuk, L. L. (Kishinev Med. Inst., USSR). *Zdravookhr. Ross. Fed.* (3):17-20, 1972.

5172 GUIDELINES FOR THE DIAGNOSIS OF ACUTE PANCREATITIS. *(Ger.)* Gulzow, M.; Schoenemann, J.; Zastrow, R.; Diwok, K. (Med. Clin. Univ. Rostock, Germany). *Z. Aerztl. Fortbild.* 65(23):1239-1240, 1971.

5173 CHOLANGIOGRAPHY THROUGH A DRAIN AFTER BILIARY TRACT SURGERY. *(Rus.)* Mzhel'sk

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174 COMPARISON OF WHOLE MILK AND SKIM MILK WITH AQUEOUS LACTOSE SOLUTION IN LACTOSE OLERANCE TESTING. *(E.)* Leichter, J. (Sch. Home conomics, Univ. British Columbia, Vancouver, anada). *Am. J. Clin. Nutr.* 26(4):393-396, 1973.

75 SERUM PROTEIN CHANGES IN THE DIAGNOSIS OF LIVER DISEASE. *(Ger.)* Wildhirt, E. Munic. Hosp., Kassel, Germany). *Dtsch. Med. J.* 3(3):234-237, 1972.

5176 NEW ENDOSCOPIC METHODS OF EXAMINATION IN GASTROENTEROLOGY. *(Ger.)* Heinkel, K. (Med. Clin., Stuttgart-Bad Cannstatt, Germany). *Dtsch. Med. J.* 23(3):161-162, 1972.

5177 THE RECOGNITION AND INTERPRETATION OF EXTRAHEPATIC UPTAKE OF ^{99m}Tc SULPHUR COLLOID IN LIVER SCANNING. *(E.)* Park, C. H.; Mansfield, C. M. (Thomas Jefferson Univ. Hosp., Philadelphia, Pa.). *J. Natl. Med. Assoc.* 65(2): 104-107, 1973.

See also, 5178, 5204, 5404.

GASTROINTESTINAL DISEASES

ESOPHAGUS

5178 NEW CRITERION IN THE ESOPHAGOSCOPIC DIAGNOSIS OF SLIDING TYPE HIATAL HERNIA. *(E.)* Ortega, J. A. (Gen. Hosp. Social Security Inst., Caracas, Venezuela). *Am. J. Gastroenterol.* 57(5):410-415, 1972.

Hiatal hernia was demonstrated radiologically in 82 cases. These cases, and a control group of 20 patients, were studied endoscopically with the intent of finding a better way to diagnose sliding type hiatal hernia. It was concluded that there are 2 easily recognizable endoscopic points of reference, the cardial lunule and the esophagogastric mucosal union. The diagnosis of hiatal hernia can be made precisely by esophagoscopy if the separation between the anatomic and mucosal union is more than 4 cm and the cardial lunule shows undulated borders. When a severe esophagitis is present, serial biopsies under direct esophagoscopic vision confirm the endoscopic observations.

5179 HYPERCALCEMIA IN EPIDERMOID TUMORS OF THE HEAD AND NECK AND ESOPHAGUS. *(E.)* Stephens, R. L.; Hansen, H. H.; Muggia, F. M. (Univ. Kansas Med. Ctr., Kansas City). *Cancer* 31(6):1487-1491, 1973.

Epidermoid carcinoma of the esophagus was reviewed in 16 male patients. Of these 16, 9 developed significant hypercalcemia. Serum calcium values were 12.0-17.2 mg/100 ml. The time from tissue diagnosis to the time of maximal hypercalcemia was 0-15 months. Alkaline phosphatase was elevated in 5 of the 7 patients in whom it was measured, ranging from 97-400 IU/ml. Serum albumin was depressed in all in whom it was measured, ranging from 2.0-3.2 g/100 ml. Bone survey X-rays performed in 5 patients showed a clearly defined destructive bone lesion in 1 patient. Tissue evidence of bone marrow invasion by tumor was seen in 2 of 7 patients who had bone marrow biopsies. Autopsies were performed in 4 cases and only 1 showed bone involvement. Parathyroid glands were normal in all 4 cases. The finding of 56% occurrence of hypercalcemia in cases of epidermoid tumors of the esophagus reflects a frequency of this complication considerably greater than previously reported.

5180 HISTOCHEMICAL STUDIES ON HUMAN MUCOUS SECRETING GLANDS IN THE SOFT PALATE, UVULA AND ESOPHAGUS. *(E.)* Lambert, R.; Pansu, D.; Berard, A.; Vitani, C.; Dechelette, M. A. (Edouard Herriot Hosp., Lyon, France). *Digestion* 8(2):110-119, 1973.

Histochemical tests on the mucous glands in the soft palate, uvula, and esophagus (esophageal glands proper and esophageal cardiac glands) disclosed the presence of sulfate esters and carboxylic groups in the mucosubstances of 9 subjects (8 male and 1 female, aged 30-85 yr). In 4 cases the patients died without digestive diseases. In the other 5 cases, specimens were collected after surgery had been carried out for gastric (1) or esophageal (4) tumors. The basophilia decreased progressively in the oral-aboral direction, acidic mucosubstances (sialomucins and sulfomucins) were prevalent in the uvula, still abundant in the esophageal glands, and totally lacking in the gastric cardia glands immediately below the transition of Malpighian to gastric epithelium.

5181 ESOPHAGEAL PERFORATION: PATHOGENESIS, SPECIAL DIAGNOSIS, AND THERAPY. *(Ger.)* Muhe, E.; Bunte, H.; Burger, L.; Huhnlein, H. K. (Surg. Clin., Univ. Erlangen-Nurnberg, Erlangen, Germany). *Dtsch. Med. Wochenschr.* 97(6):180-183, 1972.

Esophageal perforation was diagnosed immediately to 35 days after it occurred in 13 patients (3 males and 10 females, aged 2-75 yr) by radiological examination with meglumine diatriazoate or the detection of this contrast medium in the urine. Perforation was spontaneous in 2 cases and instrumental in 11. Treatment was surgical in 9 cases: the perforation was sutured in 8 and in 1 the terminal esophagus was resected and anastomosed to the gastric fundus. Of these 9 patients, only 1 died, a patient whose perforation was not diagnosed until 35 days after it occurred. Because of their advanced age or poor general condition, 4 patients received conservative treatment with suction drainage and large doses of antibiotics; 2 of the 4 died. From these findings and a review of 897 cases of esophageal perforation reported in the literature, it is concluded that survival rates are best in patients whose perforations are diagnosed early. The treatment of choice is immediate surgical exposure of the perforation, double-layered suturing, and protective sealing with adjacent tissue.

5182 OUR EXPERIENCE IN REPLACING THE ESOPHAGUS WITH THE COLON IN PEDIATRIC PATHOLOGY. *(It.)* Vanini, V.; Locatelli, G.; Alfieri, O. (Osp. Maggiore, Bergamo, Italy). *Ateneo Parmense* 42(6):811-817, 1971.

5183 RELATIONSHIP BETWEEN ESOPHAGEAL MONILIASIS AND DIVERTICULOSIS. *(E.)* Culver, G. J.; Montes, M.; Adler, R. (Med. Coll. State Univ. New York, Buffalo). *N.Y. State J. Med.* 73(8):996-999, 1973.

5184 TREATMENT OF CARCINOMA OF THE ESOPHAGUS AND GASTRIC CARDIA WITH CONCENTRATED PREOPERATIVE IRRADIATION FOLLOWED BY EARLY OPERATION. *(E.)* Groves, L. K.; Rodriguez-Antunez, A. (Cleveland Clin., Ohio). *Ann. Thorac. Surg.* 15(4):333-338, 1973.

5 THE PALLIATION OF OESOPHAGEAL CARCINOMA. *(E.)* Pringle, R.; Winsey, H. S. (Roy. irm., Dundee, Scotland). *J. R. Coll. Surg. Edinb.* 3):188-190, 1973.

6 OESOPHAGEAL INTUBATION IN OBSTRUCTIVE LESIONS OF THE OESOPHAGUS. *(E.)* John, T. (Roy. United Hosp., Bath, England). *Br. J. g.* 60(5):403-406, 1973.

7 MOUSSEAU-BARBIN TUBES FOR THE TREATMENT OF CARCINOMA OF THE LOWER TWO-THIRDS OF THE OPHAGUS. RESULTS AND OPERATIVE TECHNIQUES. *(E.)* den, M. P.; Wooler, G. H.; Ionescu, M. I. (Dept. diothoracic Surg., Univ. Leeds, England). *Br. J. g.* 60(5):401-402, 1973.

8 ESOPHAGITIS CYSTICA. *(E.)* Voirol, M. W.; Welsh, R. A.; Genet, E. F. (Louisiana te Univ. Med. Ctr.). *Am. J. Gastroenterol.* 59 :446-453, 1973.

5189 SURGICAL CONSIDERATIONS IN THE MANAGEMENT OF HIATAL HERNIA AND ESOPHAGITIS. *(E.)* Polk, Jr., H. C.; Ahmad, W.; Harter, J. S. (Univ. Louisville Sch. Med., Ky.). *J. Ky. Med. Assoc.* 71(5):317-320, 1973.

5190 CARCINOMA OF THE ESOPHAGUS DEVELOPING IN PROGRESSIVE SYSTEMIC SCLEROSIS. *(E.)* Johnson, R. B.; Monroe, L. S. (Scripps Clin., Res. Fdn., La Jolla, Calif.). *Gastrointest. Endosc.* 19(4):189-191, 1973.

See also, 5001, 5012, 5126, 5197, 5198, 5209.

STOMACH

1 GASTRIC CARCINOMA IN NEW ZEALAND. SOME EPIDEMIOLOGIC-PATHOLOGIC ASPECTS. *(E.)* o, T. (Cancer Res. Inst., Fukuoka, Japan). *Cancer* 6):1498-1507, 1973.

epidemiologic-pathologic study was made of gastric cinoma in a defined area of New Zealand with a ulation of 532,731. There were 1,063 male and female patients suffering from gastric carcinoma the period 1950-1970 inclusive. A further group Maori patients was identified from throughout Zealand; this totaled 186 male and 112 female ients in the period 1953-1968 inclusive. The idence rates were higher in Maoris than in Euro- ns. In comparison with Europeans, the Maoris e relatively younger in both sexes. In both the opeans and Maoris, there was increased incidence the disease with increasing age. Among Europeans ing in urban areas the incidence was higher than ng nonurban dwellers. The reverse was true among ri patients. Histologic material was available study from the European series in 438 of the male 288 of the female patients. In the males, 18% e of a multihistologic appearance, as were 17% the females. The ratios of adenocarcinoma to fuse carcinoma are 1.75 to 1 for males and 2.32 1 for females. Diffuse carcinoma was more common ng the younger age groups, while adenocarcinoma more common in the older age groups. When compared h Japanese, Korean, and American series, the his- ogic appearance of the New Zeland series showed significant difference, despite definite differences in incidence and mortality rates in these countries. Thus, the carcinogenic stimuli for the stomach could be the same in both high and low mortality countries. A factor of determination of the histologic type may be in close relationship to the age of the patient and could be common to all 4 ethnic groups.

5192 HOST RESISTANCE TO GASTRIC ADENOCARCINOMATOSIS IN THREE STRAINS OF RATS INGESTING N-METHYL-N'-NITRO-N-NITROSOGUANIDINE. *(E.)* Bralow, S. P.; Gruenstein, M.; Meranze, D. R. (Temple Univ. Health Sci. Ctr., Philadelphia, Pa.). *Oncology* 27(2):168-180, 1973.

N-methyl-N'-nitro-N-nitrosoguanidine (NG) in drinking water (83 mg/l) results in a high incidence of gastric adenocarcinoma in random-bred Wistar rats. When NG was discontinued after 25 weeks, 61% of animals developed cancer and after 52 weeks the incidence was 73%. In a Wistar-Mai-Furth group (39th generation of brother to sister mating) invasive adenocarcinoma was found in 12% of rats ingesting NG for 25 weeks and 10% exposed for 52 weeks. No adenocarcinomas and only 2 sarcomas were found in 50 Buffalo-Main rats (56th generation of brother to sister mating) receiving NG for 52 weeks. Varying the dose and frequency of NG administration did not overcome host resistance. These results suggest that a genetic element may be important in gastric carcinogenesis in the rat. It is also suggested that progressive inbreeding increases resistance to cancer formation in the stomach. The variations in host resistance may be used to study cancer-promoting agents (whose action would be of greater significance if they could produce cancer in a more resistant strain) as well as carcinogenic inhibitors (whose action would be more significant if effective in the random-bred rat). Attempts to transplant gastric carcinoma from Wistar random-bred rats to animals of the same or another strain were unsuccessful.

5193 PROTEIN-LOSING POLYPOUS TUMOUR OF THE STOMACH. FUNCTIONAL AND ULTRASTRUCTURAL STUDIES IN A CASE WITH EXCESSIVE HYPOPROTEINAEMIA. *(E.)* Rask-Madsen, J.; Nielsen, M. H.; Schwartz, M.; Wanstrup, J. (Glostrup Hosp., Copenhagen, Denmark). *Scand. J. Gastroenterol.* 8(3):245-250, 1973.

A case of gastric tumor is reported in a 61 yr old man in whom the cardinal symptom was hypoproteinemic edema, caused by an almost selective loss of albumin from the tumor itself. The albumin synthesis was normal, but degradation increased to 20.3%. An attempt was made to define whether the protein loss was caused by increased mucosal permeability, or whether it was due to secretory activity of gastric tumor cells. Intragastric secretion rate of ^{125}I-polyvinylpyrrolidone albumin, IgG, and alpha-2-macroglobulin suggested that different sizes of molecules were separated by seiving or filtering from the blood out into the lumen of the stomach. Morphological investigations showed that proteins actually appeared in the extra capillary tissue of the tumor, where fibrin precipitates might be the factor causing molecular sieving of proteins via defects in the epithelial lining. No visible 'pores' in the cells and/or basement membranes were found and no direct morphological evidence for the seiving was established.

5194 SERUM GASTRIN RESPONSE TO INSULIN HYPOGLYCAEMIA: STUDIES AFTER PARIETAL CELL VAGOTOMY AND AFTER SELECTIVE GASTRIC VAGOTOMY. *(E.)* Korman, M. G.; Hansky, J.; Coupland, G. A. E.; Cumberland, V. H. (Monash Univ. Dept. Med., Melbourne, Australia). *Scand. J. Gastroenterol.* 8(3):235-239, 1973.

Serum gastrin and gastric acidity in response to insulin hypoglycemia have been compared in 30 patients with duodenal ulcer after parietal cell vagotomy (10 men and 2 women, aged 24 to 60 yr), selective vagotomy (8 men and 2 women, aged 24-62 yr) and intragastric neutralization with bicarbonate (6 men and 2 women, aged 23-56 yr). After parietal cell vagotomy, serum gastrin rose from a basal level of 43 pg/ml to a peak of 174 pg/ml and acidity remained about the basal level of 14 mEq/l. After selective gastric vagotomy, both serum gastrin and gastric acidity remained unchanged at 50 pg/ml and 12 mEq/l, resp. In unoperated patients with concomitant intragastric neutralization, serum gastrin rose from 9 pg/ml to a modified basal level of 49 pg/ml and after insulin to a peak of 177 pg/ml. Therefore, parietal cell vagotomy diminishes acid secretion without alteration in antral function, intact vagal innervation to the antrum is necessary for the release of gastrin in response to insulin hypoglycemia, and the physiological effects of parietal cell vagotomy can be simulated by achieving intragastric neutralization in the unoperated patient with duodenal ulcer. These results indicate that parietal cell vagotomy and selective gastric vagotomy decrease acid secretion to the same degree, but that vagal release of gastrin can still occur after parietal cell vagotomy. Therefore, complete vagal denervation of the parietal cell mass is the key to reducing acid secretion after vagal section for, in spite of the gastrin release still occurring, the parietal cells respond at a greatly reduced level to the amount of gastrin circulating. Thus the recurrence rate after complete parietal cell vagotomy need be no greater than that after complete selective gastrin vagotomy.

5195 GASTRIC H^+ AND PEPSIN SECRETION IN GASTRITIS. *(E.)* Burhol, P. G.; Berstad, A.; Myren, J. (Ulleval Hosp., Oslo, Norway). *Scand. J. Gastroenterol.* 8(3):265-271, 1973.

Suction biopsies were obtained from the fundus or the body of the stomach, and gastric juice aspirated continuously for 1 hr before and 1 hr after injection of histamine (30 μg base/kg s.c.) in each of 50 patients (33 men and 17 women, aged 26-80 yr) with dyspeptic complaints but no peptic ulcer or gastric cancer. The gastritis tended to increase with increasing age; none with atrophic gastritis was below 40 yr of age. Gastritis not only reduces but also delays the gastric H^+ and pepsin responses to histamine, so that a s.c. histamine test may be of value in the diagnosis of atrophic gastritis. The H^+ secretion appeared to fail before the pepsin secretion in the subjects with atrophic gastritis, but not in those with superficial gastritis. It is suggested that the gastric secretion in the patients with atrophic gastritis may be subject to sustained gastrin stimulation not present in the others with a higher gastric H^+ secretion.

5196 CONGENITAL HYPERTROPHIC PYLORIC STENOSIS. *(E.)* Owens, M. P.; Beljan, J. R. (Sacramento Med. Ctr., Calif.). *Calif. Med.* 118(5):33-37, 1973.

5197 GASTRIC AND ESOPHAGEAL TELANGIECTASIA: A CASE REPORT. *(E.)* Schaefer, R. A.; Goldstein, M. J. (Cornell Univ. Med. Coll., New York, N. Y.). *Gastrointest. Endosc.* 19(4):192-193, 1973.

5198 REMOVAL OF AN INTRAGASTRIC FOREIGN BODY USING THE FLEXIBLE FIBEROPTIC ESOPHAGOSCOPE. *(E.)* Griswold, F. C.; Haislip, C. E.; Gardner, R. J. (West Virginia Univ. Med. Ctr., Morgantown). *Gastrointest. Endosc.* 19(4):194-195, 1973.

199 STUDY OF LYMPH FLOW FROM THE GASTRIC CARDIA
DURING SURGERY FOR CANCER. *(Rus.)*
ronin, V. I. (N. I. Pirogov 2nd Moscow Med. Inst.,
SSR). *Eksp. Khir. Anesteziol.* 17(3):27-30, 1972.

200 "STITCH" GRANULOMA: A CONSIDERATION IN
THE DIFFERENTIAL DIAGNOSIS OF THE INTRA-
URAL GASTRIC TUMOR. CASE REPORT. *(E.)* Sanders, I.;
oesner, M. E. (Loma Linda Univ. Sch. Med., Calif.).
m. J. Gastroenterol. 57(6):558-562, 1972.

201 RENOGASTRIC FISTULA: CASE REPORT AND
REVIEW OF THE LITERATURE. *(E.)* Dunn, M.;
irk, D. (Radcliffe Infirm., Oxford, England).
. Urol. 109(5):785-787, 1973.

202 THE EFFECT OF GASTRIC RESECTIONS AND
DENERVATION UPON GROWTH IN MINIATURE SWINE.
E.) Othersen, Jr., H. B.; Garcia, R.; Doering., III,
. J. (Med. Univ. South Carolina, Charleston). *J.
ediatr. Surg.* 8(2):159-163, 1973.

203 INDICATIONS FOR SURGICAL INTERVENTION IN
UPPER GI BLEEDING. *(E.)* Elliott, D. W.
Univ. Pittsburgh Sch. Med., Pa.). *Hosp. Phys.*
(4):64-67, 1973.

204 ENDOSCOPIC DIAGNOSIS OF DUODENAL NEOPLASMS.
(E.) Maimon, H. N.; Brady, P. G.;
illigan, F. D. (Johns Hopkins Univ. Sch. Med., Hosp.).
ohns Hopkins Med. J. 132(4):206-211, 1973.

205 GASTROINTESTINAL PHYSIOPATHOLOGY OF THE
OPERATED STOMACH. *(Sp.)* Garibotti, A. C.;
ampitelli, A. J.; Muzzio, C. A.; Mombello, R. A.
Diego E. Thompson Munic. Hosp., Buenos Aires,
rgentina). *Semana Med.* 140(8):216-227, 231; 1972.

206 EFFECT OF THYROID HORMONES ON INDUCTION OF
STOMACH CANCER IN RATS. *(Rus.)* Beloshapko,
. A. (Inst. Nutr., Moscow, USSR). *Vopr. Onkol.*
8(5):102-103, 1972.

207 RADIOLOGICAL DIAGNOSIS OF ACUTE ABDOMEN
WITH SPECIAL CONSIDERATION OF GASTRODUO-
ENAL PERFORATION. *(Ger.)* Lohr, E.; Mund, K.;
ottcher, I. (Essen Clin., Ruhr Univ., Germany).
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208 PYLORIC CANAL SYNDROMES. *(E.)* Torrance,
H. B.; Maclennan, I. (Roy. Infirm., Man-
hester, England). *J. Roy. Coll. Surg. Edinb.* 18
3):180-182, 1973.

209 CHRONIC HEARTBURN: CAUSES AND REMEDIES.
(E.) Castell, D. O. (U.S. Naval Hosp.,
hiladelphia, Pa.). *Nav. Res. Rev.* 26(3):8-13, 1973.

5210 CARCINOMA OF THE CARDIA AND FUNDUS OF THE STOMACH. *(E.)* Fierst, S. M. (Coll. Med., State Univ. New York, Brooklyn). *Am. J. Gastroenterol.* 57(5):403-409, 1972.

5211 SEVERE PROBLEMS WITH GASTRIC EMPTYING AFTER GASTRIC SURGERY. *(E.)* Jordan, Jr., G. L.; Walker, L. L. (Baylor Coll. Med., Houston, Tex.). *Ann. Surg.* 177(6):660-668, 1973.

5212 MANAGEMENT OF POSTOPERATIVE ALKALINE REFLUX GASTRITIS. *(E.)* Joseph, W. L.; Rivera, R. A.; O'Kieffe, D. A.; Geelhoed, G. W.; McCune, W. S. (George Washington Univ. Med. Ctr., Washington, D. C.). *Ann. Surg.* 177(6):655-659, 1973.

5213 GASTRIC VOLVULUS: TWO CASES. *(Turk.)* Aker, Y.; Uzer, F. (Med. Fac., Ankara Univ., Turkey). *Tip. Fak. Mecm.* 24(6):1175-1188, 1971.

5214 CANCER OF THE GASTRIC STUMP. *(Rum.)* Posteuca, M.; Andriu, V.; Lerner, C.; Galeriu, G. (Suceava Hosp., Rumania). *Rev. Med. Chir. Soc. Med. Nat. Iasi* 75(4):927-932, 1971.

5215 SURGERY FOR NEUROGENIC GASTRIC TUMORS. *(Ger.)* Kivelitz, H.; Kleinschmidt, F. (Surg. Clin., Univ. Dusseldorf, Germany.) *Bruns Beitr. Klin. Chir.* 219(5):415-419, 1972.

See also, 5011, 5018, 5127, 5140, 5155, 5158, 5184, 5224, 5236, 5259, 5339, 5342.

Peptic Ulcers

5216 PEPTIC ULCERATION IN CHRONIC RENAL FAILURE. *(E.)* Shepherd, A. M. M.; Stewart, W. K.; Wormsley, K. G. (Maryfield Hosp., Dundee, Scotland). *Lancet* (7816):1357-1359, 1973.

End-stage chronic renal failure was reviewed in 15 patients in whom the diagnoses were chronic glomerulonephritis (7), analgesic nephropathy (3), chronic pyelonephritis (2), polycystic disease (1), hereditary chronic nephritis (1), and undefined chronic renal disease (1). All patients had been receiving chronic maintenance hemodialysis of 3-60 months duration. Of the 15, 8 had a demonstrable duodenal ulcer and 1 other had a gastric ulcer. Of these 9, only 4 complained of pain attributable to the ulceration. This 53% frequency of duodenal ulceration is extremely high, even for patients undergoing maintenance hemodialysis. Most were asymptomatic and this is attributed in part to the relatively large doses of aluminum-hydroxide gel (5.2 g/day) given each to prevent hyperphosphatemia. There was no indication that the duodenal ulceration and the chronic renal disease were common manifestations of some underlying pathophysiological process; thus, it is assumed that the high frequency of duodenal ulceration is the consequence of the chronic renal disease or of its treatment by hemodialysis. The basal and nocturnal secretion of gastric acid was much greater than in normal subjects, and it is suggested that spontaneous gastric-acid secretion be monitored in such patients so that appropriate treatment can be given should gastric hypersecretion commence.

5217 ACUTE DUODENAL ULCERATIONS IN THE GUINEA PIG DUE TO FASTING. DELINEATION OF EXPERIMENTAL MODEL. *(E.)* Jervis, H. R.; Sheahan, D. G.; Sprinz, H. (Walter Reed Army Inst. Res., Washington, D.C.). *Lab. Invest.* 28(4):501-513, 1973.

Guinea pigs (Walter Reed strain) deprived of food for 1-5 days developed duodenal, but not gastric, lesions. These lesions were characterized by severe villous atrophy and ulcerations. Such a technique may offer another simple experimental animal model to study various aspects of the ulcer problem. Fasting caused early mucin depletion in the Brunner's glands and later loss of mucosal enzymatic activity. It also produced slight changes in the intraluminal pH of stomach and small intestine when measured by direct introduction of an electrode into the lumen. In the guinea pig the pancreatic duct opens into the bowel 10 cm below the pylorus, a site distal to that of the duodenal lesions. Therefore, the loss of Brunner's glands secretions may expose the duodenal mucosa to the injurious effects of acid gastric content unbuffered by either pancreatic or Brunner's glands secretions. Autodradiographic studies showed that fasted animals had similar tritiated thymidine uptake in both villous and nonvillous areas; fasted animals showing only mucosal atrophy without severe ulcerations had a tritiated thymidine uptake similar to that of controls, while fasted animals with severe ulcerations had markedly reduced uptake throughout the gut compared with fasted animals without ulcerations or controls. The formation of lesions in the fasting guinea pig appears to be related to the mucin depletion of the Brunner's glands and to exposure of the mucosa to unbuffered gastric juice, leading to accelerated extrusion of epithelial cells without a concomitant acceleration of mucosal renewal. Ulcers are associated with decreased uptake in duodenal epithelium and appear to be related to the incapacity of a reduced cell population to maintain epithelial integrity.

5218 A DOUBLE-BLIND TRIAL OF ORAL GEFARNATE IN DUODENAL ULCER. *(E.)* Newman, C. R.; Montgomery, D. A. (Princess Alexandra's Roy. Air Force Hosp., Wroughton, England). *Br. J. Clin. Pract.* 27(3):85-86, 1973.

5219 VAGOTOMY AND PYLOROPLASTY IN THE TREATMENT OF BLEEDING PEPTIC ULCER: RETROSPECTIVE STUDY FOR 1968-1970. *(Ger.)* Hell, K.; Schultheiss, H. R.; Schuman, L.; Allgower, M. (Munic. Hosp., Basel, Switzerland). *Schweiz. Med. Wochenschr.* 102(32):1112-1117, 1972.

5220 EVALUATION OF VAGOTOMY AND PYLOROPLASTY IN THE TREATMENT OF PEPTIC ULCER. *(Fr.)* Parent, M.; Corman, J. (Notre Dame Hosp., Montreal, Canada). *Union Med. Can.* 101(2):250-257, 1972.

5221 EFFECT OF LUTEOLIN, APIGENIN, AND ACACETIN ON EXPERIMENTAL GASTRIC ULCERS. *(It.)* Ciaceri, G.; Attagile, G. (Dept. Pharmacol., Fac. Sci., Univ. Catania, Italy). *Minerva Med.* 63(29):1665-1668, 1972.

5222 CATECHOLAMINES IN THE URINE OF PATIENTS WITH PEPTIC ULCER. *(Rus.)* Lezhava, Ia. P. (Tbilisi State Med. Inst., USSR). *Soobshch. Akad. Nauk Gruzinsk. SSR* 67(2):453-455, 1972.

5223 TRAUMA OF THE EXTRAHEPATIC BILIARY TRACT AND PANCREATIC DUCT WITH VARIOUS TECHNIQUES FOR THE SURGICAL TREATMENT OF PEPTIC ULCER. *(Rus.)* Tsybyrne, K. A.; Semeniuk, E. Ia. (Kishinev Med. Inst., USSR). *Zdravookhr. Ross. Fed.* (3):25-28, 197

5224 GASTRIC BEZOARS: A FREQUENT COMPLICATION IN THE POSTOPERATIVE ULCER PATIENT. *(E.)* Goldstein, H. M.; Cohen, L. E.; Hagen, R. O.; Wells, R. F. (Brooke Army Med. Ctr., Fort Sam Houston, Tex.) *Diagn. Radiol.* 107(2):341-344, 1973.

:25 CHOLEDOCHODUODENAL FISTULA: A RARE COMPLICATION OF DUODENAL ULCER. REPORT OF
IREE CASES. *(E.)* Bickham, Jr., C. E. (Doctors
osp., Washington, D.C.). *Med. Ann. D.C.* 42(5):
17-220, 1973.

:26 GASTRIC ULCER TREATED BY VAGOTOMY, PYLOROPLASTY, AND ULCERECTOMY. *(E.)* Daniels,
. A.; Strachan, A. W. B. (Barrow, Furness Group
osp., England). *Br. J. Surg.* 60(5):389-391, 1973.

:27 ETIOLOGICAL MECHANISMS IN GASTRIC ULCER. *(Fr.)* Cowley, D. J.; Baron, J. H. (Univ.
osp. South Manchester, England). *Biol. Gastro-*
terol. (Paris) 5:117-126, 1972.

28 A RATIONALE FOR SURGERY OF PEPTIC ULCER. *(E.)* Womack, N. A. (Univ. North Carolina
:h. Med., Chapel Hill). *South. Med. J.* 66(5):
5-606, 1973.

29 GASTRIC AND DUODENAL ULCERATION ASSOCIATED WITH ASPIRIN INGESTION. *(E.)* Phillips,
F. (Mayo Clin., Fdn., Rochester, Minn.). *Gastro-*
test. Endosc. 19(4):169-171, 1973.

:30 THE ASSOCIATION OF PEPTIC ULCER AND ABDOMINAL AORTIC ANEURYSM AND ITS SIGNIFI-
NCE. *(E.)* Bouhoutsos, J.; Barabas, A.; Martin,
(Hammersmith Hosp., London, England). *Br. J.*
rg. 60(4):302-304, 1973.

31 SOME EXPERIMENTS OF NATURE ON THE PROBLEM OF PEPTIC ULCER. *(E.)* Dragstedt, L. R.
niv. Florida Med. Sch., Gainesville). *Proc. Inst.*
d. Chic. 29(8):265-266, 1973.

5232 BENIGN GASTOCOLIC FISTULA: REPORT OF TWO CASES. *(E.)* Broders, C. W. (Scott, White Clin., Temple, Tex.). *Am. Surg.* 39(6):342-343, 1973.

5233 DEGLYCYRRHIZINATED LIQUORICE IN DUODENAL ULCER. *(E.)* Tewari, S. N.; Wilson, A. K. (Grady Mem. Hosp., Atlanta, Ga.). *Practitioner* 210 (1260):820-823, 1973.

5234 A COMPARATIVE STUDY OF PEAN AND PÓLYA GASTRECTOMIES FOR ULCER. *(E.)* Vignal, J.; Setiey, L.; Grandjean, J. P.; Tissot, E.; Baudet, B.; Francillon, P.; Moulay, A. (E. Herriot Hosp., Lyon, France). *Int. Surg.* 58(6):375-377, 1973.

5235 GASTRODUODENAL ULCERATION AND HAEMORRHAGE OF NEUROGENIC ORIGIN. *(E.)* Lewis, E. A. (Roy. Children's Hosp., Melbourne, Australia). *Br. J. Surg.* 60(4):279-283, 1973.

5236 THE MANAGEMENT OF UPPER GASTRO-INTESTINAL TRACT HAEMORRHAGE. *(E.)* Hegarty, M. M.; Grime, R. T.; Schofield, P. F. (Ashton Gen. Hosp., Lancashire, England). *Br. J. Surg.* 60(4):275-279, 1973.

See also, 5026, 5129, 5194.

SMALL INTESTINE

37 IgA DEFICIENCY IN CHILDREN. IMMUNOGLOBULIN-CONTAINING CELLS IN THE INTESTINAL
COSA, IMMUNOGLOBULINS IN SECRETIONS AND SERUM
LEVELS. *(E.)* Savilahti, E. (Children's Hosp.,
lsinki, Finland). *Clin. Exp. Immunol.* 13:395-
5, 1973.

munoglobulin-containing cells in the jejunal and
ctal mucosa of 28 IgA-deficient children (aged 2
16 yr) were investigated by direct immunofluore-
ence and by measuring immunoglobulins in the
testinal juice and saliva. Serum IgA was mea-
ed by radioactive single radial immunodiffusion.
I-containing cells were predominant in all biopsy
ecimens. Their number was not altered in 3
liac patients. The number of IgG-containing cells
re elevated in the jejunal, but not in the rec-
l mucosa. The number of IgE-containing cells
was not altered. Staining of the intestinal structures with anti-IgM serum had the same characteristics as observed with anti-IgA in normal children. IgM predominated in the intestinal juice. The salivary content of IgM was higher than in the controls, but it was surpassed by IgG. Traces of IgA were detected in the sera of 18 patients. Most of these had a few IgA-containing cells in the intestinal mucosa and some had IgA in secretions. The study indicates that the deficient IgA is quantitatively replaced by IgM in the intestine of children with IgA deficiency, the number of IgM-containing cells often being elevated 4-fold in the intestinal mucosa of IgA-deficient patients. IgM in the intestine of IgA-deficient children has characteristics in common with IgA in the normal children. Thus, the contribution of IgM-containing cells in the intestine of IgA-deficient children

to the production of serum IgM is of less importance than that of IgA-containing cells to the serum level of IgA.

5238 THE MUCOSAL LESION OF THE PROXIMAL SMALL INTESTINE IN ACUTE INFECTIOUS NONBACTERIAL GASTROENTERITIS. *(E.)* Schreiber, D. S.; Blacklow, N. R.; Trier, J. S. (Boston Univ. Med. Ctr., Mass.). *N. Engl. J. Med.* 288(25):1318-1323, 1973.

Stool filtrate containing Norwalk agent was orally ingested by 15 adult male volunteers with normal base-line intestinal biopsies. Of the 15, 12 acquired clinical gastroenteritis and abnormal intestinal histology with mucosal inflammation, absorptive cell abnormalities, villous shortening, crypt hypertrophy, and increased epithelial-cell mitoses. Abnormal mucosal histologic findings persisted for at least 4 days after clinical symptoms cleared. Biopsies 6-8 weeks after illness were normal. In 1 of 3 asymptomatic volunteers a typical mucosal lesion developed; biopsies in the other 2 remained normal. Although the changes seen in the mucosa of the small intestine after Norwalk agent were characteristic, with similar features in all subjects, the histology of the lesion in Norwalk disease does not seem to be specific. These findings indicate that a characteristic intestinal lesion accompanies acute infectious nonbacterial gastroenteritis, is demonstratable a few hr before clinical illness, can occur in asymptomatic infected persons, persists for at least 4 days after disappearance of clinical symptoms, and eventually reverts to normal. The vomiting of food eaten 12-18 hr earlier by several of the volunteers indicates that gastric emptying may be delayed in this disorder. Impaired xylose absorption was noted in 5 clinically ill subjects after intraduodenal xylose instillation. This suggests that the intestinal lesion observed in Norwalk disease is associated with impaired absorptive function of the proximal small intestine.

5239 UNUSUAL ROENTGEN PRESENTATION OF A CARCINOID TUMOR OF THE ILEUM. *(E.)* Seliger, G. (New York Univ. Sch. Med., N.Y.). *Am. J. Gastroenterol.* 57(5):459-464, 1972.

A 56 yr old female presented with a 1-month history of diarrhea, abdominal cramps, and weight loss. Diffuse thickening of the *valvulae conniventes* and moderate dilatation of the bowel were revealed in a small intestinal series which showed the small bowel loops to be arranged in a circular pattern with several sharp angulations of the bowel and luminal narrowing. Luminal narrowing and mucosal thickening of a portion of the ascending colon were revealed by barium enema. Diffuse lymphosarcoma of the small and large intestine was diagnosed. Surgery showed the small bowel was dilatated from the ligament of Treitz to the ileocecal valve. A stenotic area about 1.5 cm long was found in the distal ileum, 60 cm proximal to the ileocecal valve with thickening of the bowel wall by a tumor mass extending directly from the bowel into the retroperitoneal area, and forming a large mass at the root of the mesentery. The thoracic duct was obstructed by this mass. The liver was free of any metastases. Histological diagnosis was carcinoid tumor of the ileum with invasion of the muscular wall and serosa. There was no evidence of tumor in the ascending colon.

5240 RETICULUM CELL SARCOMA OF THE SMALL INTESTINE. *(It.)* Salgarello, G.; Butti, A.; Gennari, R. (Inst. Clin. Gen. Surg. Surg. Ther., Sacred Heart Catholic Univ., Rome, Italy) *Chir. Patol. Sper.* 19(1):41-60, 1971.

Case reports are presented for 3 men, aged 43, 64, and 45 yr, resp., who underwent surgery for reticulum cell sarcomas of the small intestine. All 3 patients had signs of partial intestinal obstruction and 2 developed ileal perforations caused by the tumor. In 2 cases symptoms were produced by a single reticulum cell sarcoma of the ileum; all 3 patients had enlarged lymph nodes. Tumors were removed surgically in all 3 cases. Because of the poor general condition of the third patient, only 2 of the 4 tumors present were removed and chemotherapy was instituted after surgery. The first patient died 17 months after surgery with no further treatment. Despite cobalt therapy, the second patient died 19 months after surgery. The third patient is in good condition 15 days after surgery and is being given cyclophosphamide + vincristine.

5241 SACCULATION OF THE SMALL INTESTINE IN SCLERODERMA. *(E.)* Queloz, J. M.; Woloshin, H. J. (Temple Univ. Sch. Med., Philadelphia, Pa.). *Radiology* 105(3):513-515, 1972.

A 36 yr old female with a history of diagnosed scleroderma presented with complaints of difficulty in swallowing, weight loss, and pain associated with claw-like hand deformities. The diagnosis of scleroderma was confirmed. After a passage of 6 months, the patient was again seen with continued weight loss, dyspnea on exertion, orthopnea, and substernal pain. Barium enema at this time revealed colon sacculation. Upper gastrointestinal series revealed decreased esophageal motility, sliding hiatus hernia with gastroesophageal reflux, duodenal dilatation, and jejunal dilatation with sacculation. A review of the gastrointestinal radiographs of 9 patients with proven diagnoses of scleroderma was conducted and jejunal sacculation was retrospectively identified in 7 of the 9, thus indicating that this abnormality is a far more frequent occurrence than heretofore reported.

5242 STUDIES ON A FACTOR IN INTESTINAL STRANGULATION FLUID FROM GERMFREE AND CONVENTIONA RATS INHIBITING SERUM BACTERICIDAL ACTIVITY ON ESCHE RICHIA COLI. *(E.)* Trippestad, A.; Midtvedt, T. (Rikshospital, Oslo, Norway). *Acta Pathol. Microbiol. Scand. (B)* 81(3):342-346, 1973.

Inhibition of serum bactericidal activity by a facto in exudate collected from strangulated intestinal oops in conventional and germfree rats was studied y using the release of radioactivity from ^{32}P-la- eled *Escherichia coli* as an indicator of bacterici- al activity. The factor inhibiting serum bacteri- idal activity resisted heat treatment for 30 min at emperatures up to 100 C, indicating that the factor as not purely protein in nature. This inhibitory actor was nondialyzable, and chromatography of stran- ulation fluid from germfree rats on Sephadex G-100 ndicated that the factor had a moecular weight of ore than 100,000. Homogenates from intestinal muco- al cells contained the inhibitory factor, but its ctivity was considerably stronger in the intestinal ontents. These results indicate that high molecular eight substances of intestinal origin are responsi- le for inhibition of serum bactericidal activity by luid from strangulated loops of rat intestine.

243 CEPHALIC DUODENOPANCREATECTOMY FOR MALIGNANT TUMORS OF THE PERIAMPULLAR REGION. *or.)* Abrantes, W. L.; Oliveira, C. (Felicio Rocho sp., Belo Horizonte, Brazil). *Rev. Assoc. Med. asil* 18(5):169-172, 1971.

44 EXPERIMENTAL CLINICAL AND PATHOLOGICAL STUDY ON THE EFFECT OF ANTIINFLAMMATORY ENTS ON INTESTINAL ANASTOMOSES. *(Sp.)* Barco acia, J.; Garcia Julian, G.; Rota Moneo, M. A. ac. Med., Zaragoza, Spain). *Arch. Fac. Med. ragoza* 19(6):381-394, 1971.

45 INVAGINATION ILEUS CAUSED BY FOREIGN BODIES IN AN INVERTED MECKEL'S DIVERTICULUM: RELATIVELY UNCOMMON COMPLICATION? *(Ger.)* Kobler, ; Richter, H.; Lange, E. (Surg. Clin., Univ. Mar- rg, Germany). *Bruns Beitr. Klin. Chir.* 219(5): 1-485, 1972.

46 CONGENITAL ATRESIA OF THE SMALL INTESTINE. *(Ger.)* Schickedânz, H.; Kleinteich, B. urg. Clin., Friedrich Schiller Univ., Jena, Ger- ny). *Bruns Beitr. Klin. Chir.* 219(5):408-414, 72.

47 SMALL-BOWEL TRANSPLANTATION: AN EXPERIMENTAL STUDY. *(E.)* Holmes, J. T. (no fil.). *Ann. R. Coll. Surg. Engl.* 52(3):165-181, 73.

48 SEGMENTAL DILATION OF THE JEJUNUM. *(E.)* Rossi, R.; Giacomoni, M. A. (no affil.). *Pediatr. Surg.* 8(2):335-336, 1973.

49 MASSIVE HEMORRHAGE FROM A DUODENAL ADENOMA: A RARE INDICATION OF AN EMERGENCY GASTROINTESTINAL SURGERY. *(It.)* Liquori, G. nst. Spec. Surg. Pathol. Clin. Propedeutics, iv. Trieste, Italy). *Acta Chir. Ital.* 27(4): 1-269, 1971.

5250 ISCHEMIC BOWEL DISEASE. *(E.)* Anonymous. *Postgrad. Med.* 53(3):136-142, 1973.

5251 MASSIVE SMALL-BOWEL RESECTION IN AN INFANT: LONG-TERM MANAGEMENT AND INTESTINAL ADAPTATION. *(E.)* Bell, M. J.; Martin, L. W.; Schubert, W. K.; Partin, J.; Burke, J. (Coll. Med., Univ. Cincinnati, Ohio). *J. Pediatr. Surg.* 8(2):197-204, 1973.

5252 MICROBIAL COLONIZATION OF THE INTESTINAL EPITHELIUM IN SUCKLING MICE. *(E.)* Davis, C. P.; McAllister, J. S.; Savage, D. C. (Dept. Microbiol., Univ. Texas, Austin). *Infect. Immun.* 7(4):666-672, 1973.

5253 EXTRAOSSEOUS OSTEOGENIC SARCOMA OF THE SMALL BOWEL DEMONSTRATED BY ^{18}F SCANNING. *(E.)* Shirazi, P. H.; Rayudu, G. V.; Fordham, E. W. (Rush-Presbyterian-St. Luke's Med. Ctr., Chicago, Ill.). *J. Nucl. Med.* 14(5):295-296, 1973.

5254 ACUTE INTESTINAL OBSTRUCTION CAUSED BY ADHESIONS IN CHILDREN. *(Rus.)* Bairov, G. A. (Leningrad Pediatr. Med. Inst., USSR). *Vestn. Khir.* (5):59-67, 1972.

5255 PSEUDOSTRANGULATION OF AN EPIGASTRIC HERNIA, PRODUCED BY A MECKEL'S DIVERTICULUM, WITH STRANGULATION ILEUS. *(Ger.)* Sedlarik, K.; Zeuner, L. (Arnstadt Regional Hosp., Germany). *Dtsch. Gesundheitsw.* 27(35):1676-1679, 1972.

5256 OBSERVATIONS ON THE DUODENAL MUCOSA WITH REFERENCE TO PROBLEMS ASSOCIATED WITH ITS THREE-DIMENSIONAL STRUCTURE. *(E.)* Kirby, J. R. (Hartlepool Hosp.). *Clin. Radiol.* 24:139-153, 1973.

5257 CARCINOID TUMOR OF THE ILEUM ASSOCIATED WITH ACUTE GASTRO INTESTINAL HEMORRHAGE. *(E.)* Waldron, C. W. (no affil.). *Ariz. Med.* 30(6): 405-408, 1973.

5258 CARCINOMA OF DUODENUM. *(E.)* Cortese, A. F.; McDivitt, R. W. (NY Hosp.-Cornell Med. Cen.). *NY J. Med.* 73(12):1687-1689, 1973.

5259 GASTRODUODENOSCOPY USING AN IRRIGATING CYSTOSCOPE. *(E.)* Kirk, R. M. (Hampstead Gen. Hosp. & Willesden Gen. Hosp., London). *Brit. J. Surg.* 60(4):292, 1973.

5260 ILEAL ENDOMETRIOMA: REPORT OF A CASE. *(E.)* Orda, R.; Deligdisch, L.; Stadler, J. (Tel-Aviv Univ., Israel). *Am. Surg.* 39(6):358-360, 1973.

5261 PREOPERATIVE PREPARATION, OPERATIVE TECHNIQUE, AND POSTOPERATIVE CARE OF PATIENTS UNDERGOING JEJUNOILEAL BYPASS FOR MASSIVE EXOGENOUS OBESITY. *(E.)* Schwartz, M. Z.; Varco, R. L.; Buchwald, H. (Dept. Surg., Univ. Minnesota, Minneapolis). *J. Surg. Res.* 14(2):147-150, 1973.

5262 DISSEMINATED HYPEREOSINOPHILIC DISEASE. *(E.)* Manko, M. A.; Cooper, J. H.; Myers, R. N. (Lankenau Hosp., Philadelphia, Pa.). *Am. J. Gastroenterol.* 57(4):318-325, 1972.

5263 DEUODENAL OBSTRUCTION DUE TO HODGKIN'S DISEASE OF THE LYMPH NODES AT THE PORTA HEPATIS. *(E.)* Wee, G. C.; Torres, A.; Hagen, G. (VA Hosp., Ellisville, Mo.). *Am. J. Gastroenterol.* 57(4):326-328, 1972.

5264 CHEMOTHERAPY FOR A SERIES OF DISEASES OF THE SMALL AND LARGE INTESTINE WHICH ARE CAUSED OR PERPETUATED BY MICROORGANISMS. *(Ger.)* Germer, W. D. (Wenckebach Munic. Hosp., Berlin-Tempelhof, Germany). *Dtsch. Med. J.* 23(4):280-285, 1972.

5265 EXTENSIVE INTRAMURAL INTESTINAL CALCIFICATION IN A NEWBORN WITH INTESTINAL ATRESIA. CASE REPORT. *(E.)* Steinfeld, J. R.; Harrison, R. B. (Univ. Virginia Hosp., Charlottesville). *Pediatr. Radiol.* 107(2):405-406, 1973.

5266 THE MANAGEMENT OF SMALL BOWEL OBSTRUCTION. *(E.)* Sykes, P. A.; Grime, R. T.; Schofield, P. F. (Ashton-under-Lyne Gen. Hosp., Lancashire, England). *J. R. Coll. Surg. Edinb.* 18(3):169-175, 1973.

5267 MECHANICAL MANAGEMENT OF THE ILEOSTOMY STOMA. *(E.)* Lyons, A. S.; Brockmeier, M. J. (no affil.). *Ostomy Quart.* 10(3):7-11, 1973.

5268 MULTIPLE PRIMARY CARCINOMAS OF THE SMALL INTESTINE. *(Rus.)* Guliakin, M. F.; Iudin, I. Iu.; Tsarev, B. M.; Sergevnin, V. V. (N. N. Burdenko Main Military Hosp., Moscow, USSR). *Vopr. Onkol.* 18(5):51-56, 1972.

See also, 5009, 5100, 5137, 5152, 5167, 5203, 5207, 5208, 5217, 5298, 5314, 5315, 5346, 5349, 5481, 5511, 5519.

SMALL INTESTINE

Malabsorption

5269 NUTRITIONAL STATUS AND INTESTINAL FUNCTION AMONG RURAL POPULATIONS OF THE WEST INDIES. III. BARRIO CABRETO, DOMINICAN REPUBLIC. *(E.)* Klipstein, F. A.; Rubio, C.; Montas, S.; Tomasini, J. T.; Castillo, R. G. (Univ. Rochester Med. Ctr., N.Y.). *Am. J. Clin. Nutr.* 26(1):87-94, 1973.

Dietary intake, nutritional status, and intestinal structure and function were evaluated in 42 subjects representative, on the basis of age and sex, of a rural barrio in the Dominican Republic. Mean dietary intake of the group was 25 g protein and 54 g fat/day. A deficiency of 1 or more nutrients was present in 20 subjects (47%). These included iron in 13 (31%), folate in 6 (14%), vitamin B_{12} in 4 (9%), albumin in 1 (2%), carotene in 3 (7%), and cholesterol in 9 (21%). Anemia occurred in 11 subjects (26%). Twenty-three subjects (55%) had either one (41%) or multiple (14%) abnormalities of intestinal function. These included xylose absorption in 19 (44%), fecal fat excretion in 1 (2%), nitrogen excretion in 1 (2%), and vitamin B_{12} absorption in 11 (26%). Intestinal morphology was examined in 32 cases. In 2, the structure was normal; in 8, mild 1+ changes were present; in 20, moderate 2+ abnormalities were present; and in 2, severe 3+ abnormalities were present. The presence of iron deficiency did not relate to impaired intestinal function, but rather to excessive demands of previous multiple pregnancies in most instances. On the other hand, malabsorption was a factor in the pathogenesis of deficiency of other nutrients in 13 subjects. All 4 persons deficient in vitamin B_{12} had impaired absorption of this vitamin, and 9 (75%) of the 12 who had folate, albumin, carotene, or cholesterol deficiencies had subnormal absorption of xylose. Among the 36 subjects who had normal absorption of xylose, only 3 (8%) had a deficiency of one or more of these nutrients, whereas 7 (88%) of the 8 persons who had xylose absorption of less than 4 g/5 hr had a deficiency. It is concluded that the marginal dietary intake by the subjects under study

ly rarely results in deficiency states other
an that of iron. However, when the supplemental
ctor of impaired intestinal absorption is added,
ficiencies develop in a large proportion of such
dividuals.

70 VITAMIN B_{12} ABSORPTION IN PROTEIN-CALORIE MALNOURISHED CHILDREN AND DURING RECOVERY:
FLUENCE OF PROTEIN DEPLETION AND OF DIARRHEA.
.) Alvarado, J.; Vargas, W.; Diaz, N.; Viteri,
E. (Inst. Nutr. Central America and Panama,
atemala, C.A.) *Am. J. Clin. Nutr.* 26(6):
5-599, 1973.

e absorption of ^{57}Co-vitamin B_{12} was studied by
ans of the Schilling test in 25 severely protein-
lorie malnourished children. In 10 of these, the
fect of simultaneous intrinsic factor was eval-
ted, and absorption studies were repeated after
days of therapeutic diet. Fully recovered
ldren (10) served as controls. Results indi-
te that in severe protein-calorie malnutrition,
tamin B_{12} absorption is low and does not improve
h intrinsic factor administration (the mean
inary excretion of ^{57}Co-B_{12} as percent of dose
hout intrinsic factor was 12.3; with intrinsic
tor, it was 8.4). During early recovery, the
cent urinary excretion of ^{57}Co rose to 17.0.
se tests were done with the administration of
rinsic factor. The value obtained in fully
overed children was 31.4 and that is similar to
t obtained in children with pernicious anemia
whom intrinsic factor is given. In severely
nourished children and during early recovery,
rrhea produces a marked drop in vitamin B_{12}
orption, but children without diarrhea in the
e clinical stages will absorb subnormal amounts
vitamin B_{12}. Vitamin B_{12} absorption correlates
h the creatinine height index ($r = 0.493$),
gesting that the degree of protein depletion
luences vitamin B_{12} absorption. It is suggested
t in protein-calorie malnutrition, decreased
al function allows more conjugated bile salt
reach the colon where it is subjected to bac-
ial deconjugation and dehydroxylation. Re-
ted episodes of diarrhea could have the same
ect. These results also suggest that reduced
al reserve in protein-calorie malnourished
ldren might make them diarrhea-prone.

1 MALABSORPTION SYNDROME WITH INFILTRATION OF THE INTESTINAL WALL BY EXTRACELLULAR
OCLONAL MACROGLOBULIN. *(E.)* Pruzanski, W.;
ren, R. E.; Goldie, J. H.; Katz, A. (Univ.
onto Rheumatic Dis. Unit., Canada). *Am. J. Med.*
6):811-818, 1973.

9 yr old woman presented with malabsorption and
atorrhea. There was an M component of IgM
bda type in the serum, an increase in lympho-
es and plasma cells in the bone marrow, and
enic enlargement. No other features charac-
istic of Waldenström's macroglobulinemia were
sent. Repeat per oral intestinal biopsy speci-
s revealed infiltration of the intestinal mucosa
homogeneous extracellular material which was shown to be monoclonal IgM (lambda) with an admixture of phospholipid by immunofluorescence and histochemical analysis. Marked dilatation of mucosal lymphatics and moderate numbers of plasmalymphocytic cells were also found. This appears to be the first case of malabsorption syndrome associated with monoclonal IgM, in which the immunoglobulin has been positively identified in the intestinal wall. Treatment with prednisone (40 mg/day reduced to 5 mg/day over a 4 month period) resulted in remarkable clinical improvement.

5272 ANORECTIC FORMS OF CELIAC SYNDROMES. *(Fr.)* Grenet, P.; de Paillerets, F.; Gallet, J. P.; Babinet, J. M. (Herold Hosp., Paris, France). *Ann. Med. Interne (Paris)* 123(3):237-240, 1972.

Case reports are presented for 4 infants with celiac disease in which the dominant symptom was anorexia. Because of behavior problems observed in both the children and their mothers, 2 of the 4 were first tentatively diagnosed as having anorexia nervosa. However, the anorectic form of celiac disease is characterized by 2 features uncommon in anorexia nervosa: mood disturbances and psychomotor retardation. All 4 infants were severely malnourished, withdrawn, and irritable. In all cases, institution of a gluten-free diet was followed by spectacular improvement in appetite, weight gain, and behavior. The diagnosis of celiac disease was confirmed in 3 of the 4 patients by intestinal biopsy: 2 patients had subtotal and 1 patient, complete villous atrophy. In the latter patient, gluten intolerance was associated with malabsorption of fats and sugar.

5273 AUTOANTIBODIES IN CHILDREN WITH COELIAC DISEASE. *(E.)* Brown, I. L.; Ferguson, A.; Carswell, F.; Horne, C. H. W.; MacSween, R. N. M. (Dept. Pathol., Univ. Glasgow, Scotland). *Clin. Exp. Immunol.* 13:373-382, 1973.

Antireticulin antibody was found in the serum of 32 of 48 (67%) children (24 male and 24 female, aged 1 yr 2 months - 8 yr) with celiac disease. This is a statistically significant difference from an incidence of 7 of 48 matched controls. The antibody was solely of IgG class in 66% of patients and 76% of controls and in the remainder comprised a mixture of IgG and IgA. The antibody could not be absorbed with gluten. One celiac patient had serum antinuclear factor, and 1 had smooth muscle antibody. No statistically significant differences in mean IgG, IgA, and IgM levels were demonstrable between celiac patients and controls, or between antireticulin antibody positive and negative groups. The presence of antireticulin antibody did not correlate with the presence of serum precipitins to a variety of food antigens.

5274 TOXICITY OF WHEAT GLIADIN FRACTIONS IN COELIAC DISEASE. *(E.)* Townley, R. R. W.; Cornell, H. J.; Bhathal, P. S.; Mitchell, J. D. (Roy. Children's Hosp., Melbourne, Australia). *Lancet* (7816):1363-1364, 1973.

Fraction 9, 1 of 10 fractions obtained by chromatography of a peptic-tryptic-pancreatinic digest of wheat gliadin disrupted rat-liver lysosomes, inhibited morphological improvement of celiac mucosa in organ culture, and yielded the highest hemagglutination titers with sera of patients with celiac disease. The hemagglutination tests suggest that undigested peptides of fraction 9 may penetrate the intestinal mucosa and evoke an immunological response. While immunological reactions cannot be precluded in the pathogenesis of celiac disease, they are presumably secondary to digestive defect. Since fraction 9 is defectively digested by duodenal mucosa from patients with the disease in remission, the results support the view that the lesion in celiac disease is caused by a deficiency of an intestinal peptidase which allows the accumulation of peptides which are toxic to the mucosa, perhaps by virtue of their action on lysosomes.

5275 MALABSORPTION: GUIDELINES FOR DIAGNOSIS AND TREATMENT. *(Sw.)* Einarsson, K.; Hellstrom, K. (Serafimer Hosp., Stockholm, Sweden). *Lakartidningen* 69(31):3557-3565, 1972.

5276 CURRENT FEATURES OF CELIAC DISEASE IN THE CHILD. *(Fr.)* Jean, R.; Kochoyan, P. (Clin. Childhood Dis. Hyg. Early Childhood, Montpellier, France). *Bol. Soc. Vasco Navarra Pediatr.* 6(23):229-252, 1971.

5277 LACTASE DEFICIENCY AS THE CAUSE OF CHRONIC RECURRENT DIARRHEA. *(Ger.)* Begemann, F. (1st Med. Clin., Univ. Hamburg, Germany). *Med. Klin.* 67(7):233-239, 1972.

5278 ACUTE TRANSIENT PROTEIN-LOSING GASTROENTEROPATHY IN AN ADULT. *(E.)* Mahmoud, J. McKechnie, J. (Methodist Hosp., Atlanta, Ga.). *Am. J. Gastroenterol.* 57(5):416-422, 1972.

5279 HYPOGAMMAGLOBULINAEMIA WITH WHIPPLE'S DISEASE. *(E.)* Cochran, M.; Cook, M. G.; Gallagher, J. C.; Peacock, M. (Gen. Infirm., Leeds, England). *Postgrad. Med. J.* 49(571):355-358, 1973.

5280 FISSION OF WHIPPLE'S DISEASE ROD BODIES. *(E.)* Sun, C. N.; White, H. J.; Hall, W. H. (VA Hosp., Little Rock, Ark.). *Am. J. Dig. Dis.* 18(5):532-535, 1973.

5281 SYNDROME RESEMBLING KWASHIORKOR AFTER PARTIAL GASTRECTOMY. *(E.)* Waldram, R. (St. Thomas's Hosp., London, England). *Br. Med. J.* 2 (5858):92-93, 1973.

5282 INTESTINAL MALABSORPTION OF DISACCHARIDES IN INFANTILE DIARRHEA. *(Rum.)* Chipail, A.; Schneer, J. H.; Dragan, S. (Inst. Med. Pharm., Iasi, Rumania). *Rev. Med. Chir. Soc. Med. Nat. Iasi.* 75(4):855-860, 1971.

5283 NEW LIGHT ON ETHNIC DIFFERENCES IN ADULT LACTOSE INTOLERANCE. *(E.)* Simoons, F. J. (Dept. Geog., Univ. California, Davis). *Am. J. Dig. Dis.* 18(7):595-611, 1973.

See also, 5152, 5174, 5291, 5515.

LARGE INTESTINE

5284 SIGMOID VOLVULUS IN MUSCULAR DYSTROPHY. *(E.)* Greenstein, A. J.; Kark, A. E. (Mt. Sinai Sch. Med., New York, N.Y.). *Am. J. Gastroenterol.* 57(6):571-577, 1972.

A 27 yr old caucasian male was admitted as a psychiatric patient with reactive depressive psychosis. Repeated episodes of abdominal discomfort, conjunctivitis, a urinary tract infection, and many respiratory difficulties were reported. Myotonia dystrophica was diagnosed. The appearance of the patient was noted as frontal baldness, wasting of various muscles, and inability to activate various nerves. In this patient the predominating symptoms were those of the gastrointestinal tract. Barium enema revealed free flow into a markedly redundant dilated sigmoid colon with proximal narrowing, a twist, and delayed evacuation consistent with incompletely obstructing sigmoid volvulus. Specific X-ray signs included the "Y" sign of the twisted sigmoid colon. Recurrent subacute sigmoid volvulus was diagnosed. Operation revealed an enlarged redundant sigmoid colon with fibrous inflammatory reaction at the site of twist, involving proximal

nd distal sigmoid and adjacent mesentery. Interval
igmoidoscopy with end-to-end anastomosis was
arried out with immediate and continued allevia-
ion of symptoms.

285 PERFORATION OF THE COLON ASSOCIATED WITH ADYNAMIC ILEUS. *(E.)* Wojtalik, R. S.;
indenauer, S. M.; Kahn, S. S. (Univ. Mich. Med.
tr., Ann Arbor). *Am. J. Surg.* 125(5):601-606,
973.

ilated small and large bowel with no evidence of
echanical obstruction occurred in 4 patients (3
en and 1 woman, aged 45-67 yr) in whom cecal ne-
rosis and perforation developed. Associated diag-
oses in these 4 cases were transverse myelitis,
ighth cervical vertebra; pancreatitis; atrial
eptal defect, mediastinal sepsis; and fracture of
ibia and fibula, urinary infection. Operative
indings were cecal perforation, cecal necrosis;
ecrosis of cecum, pancreatitis; transverse colon
erforation, cecal necrosis; and cecal perforation.
ne treatment given was right colectomy, ileotrans-
erse colostomy; choledochostomy, cecostomy; trans-
erse colostomy; and cecostomy. Of the 4 patients,
survived. If the fact that the intestine may
erforate as a result of prolonged or severe ileus
ithout mechanical obstruction is not recognized
nd treatment is not promptly given, death may
esult.

286 ADRENERGIC HYPERACTIVITY OF THE AGANGLIONIC COLON. *(E.)* Touloukian, R. J.;
ghajanian, G.; Roth, R. H. (Yale Univ. Sch. Med.,
ew Haven, Conn.). *J. Pediatr. Surg.* 8(2):191-
95, 1973.

ne adrenergic innervation of the normal and agan-
lionic colon was studied in 8 patients (1 neonate,
infants, and 5 older children) by fluorescent
istochemical staining and by determination of tis-
ne norepinephrine concentration. The adrenergic
erminals in the submucosal and myenteric plexus of
ganglionic colon were disordered, more plentiful,
nd chaotic in distribution, lacking the perigan-
lionic cellular network observed in normal colon.
ne tissue concentration of norepinephrine in a-
nglionic colon (1106-2727 ng/g of dried tissue)
as nearly 3 times the level found in normal colon.
ne data favor the hypothesis that adrenergic hyper-
ctivity of the aganglionic colon contributes to the
ncreased muscle tone and abnormal peristaltic acti-
ity observed in Hirschsprung's disease.

287 'FRUIT-STONE ILEUS'. *(E.)* Weaver, P. C.; Trapnell, D. H. (Westminster Hosp., London,
gland). *Br. J. Surg.* 60(3):237-239, 1973.

3 patients (1 man and 2 women, aged 55-85 yr)
dominal pain and diarrhea occurred with varying
tensity and duration. Each case had intermittent
tacks of intestinal obstruction caused by plum
ones which were unable to pass the intestinal
act due to the preexistence of a pathological form of mechanical obstruction. In each case it was radiologically proven by the "silhouette" sign that the foreign bodies were within the bowel lumen. The preexisting obstruction in these cases were: a stricture due to Crohn's disease, adhesions following appendicectomy, and a polyp. The stones then became coated with organic and inorganic material until they were large enough to cause obstruction or perforation of the bowel. It is suggested that the site of gut narrowing should be removed when intraluminal foreign bodies are removed to prevent a recurrence of the situation.

5288 CYTOTOXIC PERFUSION OF THE LIVER VIA THE UMBILICAL VEIN FOR LIVER METASTASES IN CARCINOMA OF THE COLON. *(E.)* Bevan, P. G. (Dudley Road Hosp., Birmingham, England). *Br. J. Surg.* 60(5):369-375, 1973.

Four male patients (aged 60-68 yr) with carcinoma of the large bowel and liver mestastases were treated by primary resection and perfusion of the liver with 5-fluorouracil via an umbilical vein cannula. The total 5-fluorouracil dose was 5, 10, or 15 g. Of the 4 patients, 3 were alive and well at 1 yr, but 2 died during the next few months. The patients were studied clinically by serial hematological and liver function tests and by hepatography and liver scanning. The only severe toxic effect was diarrhea in 1 patient. In 2 cases, there was definite evidence that portal perfusion influenced the metastases. In view of the ability of 5-fluorouracil in large doses to produce megaloblastic anemia through DNA-thymine synthesis inhibition, extra folic acid should be given to patients undergoing liver perfusion with this drug, especially if cirrhosis is present. Other types of gastrointestnnal tract carcinoma with liver metastases, and malignant hepatoma, may be suitable for treatment by umbilical vein perfusion. Only a few cases of carcinoma of the stomach and pancreas would be suitable due to early infiltration and lymph-node involvement.

5289 THE SIGNIFICANCE OF ENZYME HISTOCHEMICAL PATTERNS IN CARCINOMAS OF THE LARGE INTESTINE IN MAN. *(E.)* McGinty, F., Delides, G., Harrison, D. (Dept. Path., Univ. Sheffield, England). *Gut* 14(6):502-505, 1973.

The activities of 13 enzymes in 40 carcinomas of the large bowel were studied by histochemical techniques. Five enzymes—nonspecific esterase, monoamine oxidase, succinate dehydrogenase, cytochrome oxidase, and acid phosphatase—commonly show much less activity in the tumors than in adjacent normal colon. The tumors have been classified based on the number of enzymes which show markedly reduced activity in each tumor (types 1-5). The enzyme histochemical type and the size of the tumors were jointly correlated with the presence of lymph node metastasis. Small type 1 or 2 tumors do not appear to be associated with metastatic disease. Small type 5 tumors were commonly associated with secondary carcinoma in the lymph nodes. Large tumors (greater than 25 sq cm surface area) of any histochemical type were frequently associated with lymph node metastasis. It is suggested that the reduced activities of certain enzymes in proliferative disorders of the large intestine may be proportional to the rate of tumor growth. It is suggested that the reduced activities of certain enzymes in proliferative disorders of the large intestine may be proportional to the rate of tumor growth. The observed increases in LDH and diaphorase activities and the production of nicotinamide adenine dinucleotide phosphate supports this theory.

5290 SELECTIVE MESENTERIC ARTERIAL INFUSIONS IN THE MANAGEMENT OF MASSIVE DIVERTICULAR HEMORRHAGE. *(E.)* Baum, S.; Rosch, J.; Dotter, C. T.; Ring, E. J.; Athanasoulis, C.; Waltman, A. C.; Courey, W. R. (Massachusetts Gen. Hosp., Boston). *New Engl. J. Med.* 288(24):1269-1275, 1973.

Mesenteric arteriography was performed on 15 patients (11 men and 4 women, of average age 71.1 yr) with massive lower gastrointestinal hemorrhage from colonic diverticular disease. In each case, the bleeding site was localized, and selective mesenteric arterial infusion of posterior pituitary extract (0.5-1 ml/min) was successful in providing immediate control of hemorrhage. No local complications developed at the femoral arterial puncture site, and there was no evidence of intestinal ischemia as a result of the infusion. To keep the catheter open, 30-60 ml of fluid/hr are required and, since the posterior pituitary preparation is almost pure antidiuretic hormone, hyponatremia and fluid retention may develop. Therefore, it is necessary that fluid and electrolyte balance be carefully monitored during the infusion. Of the 15 patients, 7 received no further therapy and have been followed for 6 to 30 months without rebleeding. Of the remaining 8 patients, 4 had elective partial colectomies after a period of hemostasis and 4 underwent surgery for bleeding that recurred after cessation of the infusion.

5291 THE SIGNIFICANCE OF LACTOSE MALABSORPTION IN THE IRRITABLE COLON SYNDROME. *(E.)* Gudmand-Hoyer, E.; Riis, P.; Wulff, H. R. (Gentofte Hosp., Copenhagen, Denmark). *Scand. J. Gastroenterol.* 8(3):273-278, 1973.

The frequency of lactose malabsorption was investigated among patients who fulfilled certain predetermined diagnostic criteria of irritable colon and chronic diarrhea. Investigation was carried out in 98 of 114 such patients and 20 of these (8 men and 12 women, aged 19-64 yr) fulfilled the criteria for lactose malabsorption. The frequency of lactose malabsorption in the normal population is unknown but indirect investigations suggest that it is much lower. It may therefore be presumed that symptoms in a number of patients with irritable colon syndrome are caused by an underlying lactose malabsorption. It is suggested that a lactose tolerance test be done before the diagnosis 'irritable colon' is made. Milk intolerance had no diagnostic value. The 20 patients were treated with a low-lactose diet, and 13 of them became symptom-free. Since placebo effect cannot be excluded, the value of a low-lactose diet can, be assessed only *via* controlled clinical trial.

5292 PRELIMINARY STUDY OF THE ACTION OF A NEW POLYPEPTIDE, BOMBESINE, ON THE HUMAN APPENDIX IN VITRO. *(It.)* Zappia, L.; Moline, E.; Violini, A.; Bassani, F. (Inst. Pharmacol., Univ. Parma, Italy). *Ateneo Parmense* 43(3):169-174, 1972.

5293 RECTAL LEIOMYOSARCOMA. *(Sp.)* Curto, Casdus, J. A.; Font Pascual, J. A.; Sans Segarra, M. (Juan XXIII Sanitorium, Tarragona, Spain). *Rev. Esp. Enferm. Apar. Dig.* 37(2):211-218, 1972.

5294 SEGMENTARY STENOSIS OF THE SIGMOID. *(Sp.)* Miyar Gonzalez, A. (no affil.). *Rev. Esp. Enferm. Apar. Dig.* 37(2):229-240, 1972.

5295 COLONIC POLYPS. *(Sp.)* Salama, A. A.; Cabanne Bengolea, E. (Mar del Plata Regional Hosp., Argentina). *Rev. Argent. Cir.* 21(314):191-205, 1971.

5296 BLEEDING IN DIVERTICULOSIS OF THE LARGE INTESTINE. *(Cz.)* Charvat, A.; Slezak, Z.; Mayova, E. (Fac. Pediatr. Med., Charles Univ., Prague, Czechoslovakia). *Rozhl. Chir.* 51(8):526-528, 1972.

5297 FOREIGN BODIES IN THE ANORECTUM. *(Jap.)* Narumi, H.; Mitaki, N.; Jin, M.; Tann, E. (Tohoku Proctol. Clin., Hirosaki, Japan). *J. Jap. Soc. Coloproctol.* 25(3):199-204, 1972.

5298 VOLVULUS OF THE CECUM AND ASCENDING COLON. *(E.)* Grover, N. K.; Gulati, S. M.; Tagore, N. K.; Taneja, O. P. (Maulana Azad Med. Coll., New Delhi, India). *Am. J. Surg.* 125(6):672-675, 1973.

5299 EXPERIMENTAL AND CLINICAL ASPECTS OF GASTROCOLIC REFLEXES. *(E.)* Tansy, M. F.; Kendall, F. M. (Temple Univ. Health Sci. Ctr., Philadelphia, Pa.). *Am. J. Dig. Dis.* 18(5):521-531, 1973.

5300 VOLVULVUS OF THE CECUM. *(E.)* Rahbar, A.; Easley, G. W.; Mendoza, Jr., C. B. (West Virginia Univ. Sch. Med., Morgantown). *Am. Surg.* 39(6):325-330, 1973.

5301 TREATMENT OF EXTENSIVE CONDYLOMA ACUMINATA OF THE ANAL CANAL. *(E.)* Lewis, M. I. (Queen of Angels Hosp., Los Angeles, Calif.). *Int. Surg.* 58(6):412-415, 1973.

302 NEONATAL NECROTIZING ENTEROCOLITIS. *(E.)* Chappell, J. S.; Dinner, M. (no affil.). . *Afr. J. Surg.* 10(4):215-219, 1972.

303 HAEMORRHOIDS -- RESULTS OF TREATMENT BY ANORECTAL DILATION. *(E.)* Lannon, J.; ewis, H. M. (no affil.). *S. Afr. J. Surg.* 10(4):)5-209, 1972.

304 POSTOPERATIVE WOUND INFECTION IN COLONIC AND RECTAL SURGERY. *(E.)* Burton, R. C. Roy. Melbourne Hosp., Australia). *Br. J. Surg.*)(5):363-365, 1973.

305 DEPRESSION OF IMMUNE RESPONSIVENESS IN BREAST AND LARGE-BOWEL TUMOURS AS MEASUR-) BY HETEROPHILE ANTIBODY ACTIVITY. *(E.)* Thomas, . G.; Fox, M. (Roy. Hosp., Sheffield, England). *. J. Surg.* 60(5):352-355, 1973.

306 REVERSED ROTATION OF THE GUT INCIDENTAL TO CHOLECYSTITIS IN A LEFT-SIDED GALL- .ADDER. *(E.)* Stagg, L. H.; Sheiner, H. J. (C. irdner Hosp., Shenton Park, Australia). *Br. J. urg.* 60(5):413-416, 1973.

307 MELANOSIS COLI (SO-CALLED "BROWN BOWEL"). *(E.)* Moriwaki, S.; Ochi, O. (Matsuyama tl. Hosp., Ehime, Japan). *Acta Histochem. Cyto- em.* 5(3):169-184, 1972.

308 PROGNOSIS AND TREATMENT OF COLORECTAL SARCOMA. *(Jap.)* Kikkawa, N.; Aso, R.; ra, M.; Shindo, K.; Murai, N.; Yasutomi, M.; .nnai, D. (Dept. Surg., Osaka Univ., Sch. Med., pan). *J. Jap. Soc. Coloproctol.* 25(3):169-176, 72.

309 CLASSIFICATION OF FISTULAS. *(Jap.)* Sumikoshi, Y.; Takano, M.; Okada, M.; .ratsuka, J.; Sato, S. (Proctol. Ctr. Soc. Insur- ce Central Hosp., Tokyo, Japan). *J. Jap. Soc. loproctol.* 25(3):177-184, 1972.

10 NEUROMUSCULAR REFLEXES IN HIRSCHSPRUNG'S DISEASE. *(E.)* Varma, K. K.; Stephens, D. (Royal Children's Hosp. Res. Fdn., Melbourne, ctoria, Australia). *Aust. N.Z. J. Med.* 42(3): 7-311, 1973.

11 PENICILLIN AND LOCAL RECURRENCE OF CARCINOMA IN LARGE-BOWEL SURGERY. *(E.)* Hardy, J.; Hughes, E. S. R.; Cuthbertson, A. M. (Dept. rg., Univ. Melbourne, Victoria, Australia). *Aust. Z. J. Med.* 42(3):298-300, 1973.

12 HIRSCHSPRUNG'S DISEASE: LONG-TERM RESULTS OF RESECTION OF THE PROXIMAL DILATED SEG- NT. *(E.)* Sterioff, Jr., S.; White, J. J.; Ravitch, M. (Johns Hopkins Univ. Sch. Med., Baltimore, .). *J. Pediatr. Surg.* 8(2):309-316, 1973.

5313 FUNCTIONAL RECTAL CARCINOID TUMOUR AND OCULAR MYOPATHY. *(E.)* Ahmed, M.; Irfan, H. (Whitley Hosp., Coventry, Warwickshire, England). *Br. Med. J.* (5868):699, 1973.

5314 INTESTINAL FAECAL FISTULAS. *(E.)* Kaushik, S. P.; Perianayagam, W. J. (Jawaharlal Inst. Post Grad. Med. Education, Res., Pondicherry, India). *Q. J. Surg. Sci.* 8(2): 65-69, 1972.

5315 ANOMALOUS ILEOCAECAL JUNCTION. *(E.)* Singh, S. (Inst. Med. Sci., Banaras Hindu Univ., Varanasi, India). *Q. J. Surg. Sci.* 8(2):73-76, 1972.

5316 CHRONIC APPENDICITIS AND THE RESULTS OF APPENDECTOMY. *(Ger.)* Schramm, H.; Freund, E.; Schickedanz, H. (Surg. Clin., Friedrich Schiller Univ., Jena, Germany). *Z. Aerztl. Fortbild.* 66(14):717-720, 1972.

5317 DIFFUSE LYMPHOSARCOMATOSIS OF THE COLON AND RECTUM SIMULATING ULCERATIVE COLITIS. *(Dan.)* Sorensen, T. (Central Hosp., Herning, Denmark). *Ugeskr. Laeger* 134(39):2045-2046, 1972.

5318 THE CONTINUING CHALLENGE OF COLORECTAL CARCINOMA. *(E.)* Burdette, W. J. (Univ. Texas, Houston Med. Sch.). *Hosp. Pract.* 8(5): 146-153, 1973.

5319 LARGE INTESTINAL POLYPS AND COLOSCOPIC POLYPECTOMY. *(Ger.)* Ottenjann, R. (City Hosp., Munich-Neuperlach, Germany). *Dtsch. Med. Wochenschr.* 98(13):677-680, 1973.

5320 EXCESSIVE MORBIDITY RESULTING FROM THE PREVENTION OF INTESTINAL ADHESIONS WITH STEROIDS AND ANTIHISTAMINES. *(E.)* Grosfeld, J. L.; Berman, I. R.; Schiller, M.; Morse, T. S. (New York Univ. Sch. Med., N.Y.). *J. Pediatr. Surg.* 8(2):221-226, 1973.

5321 RADIOTHERAPY OF RECTAL CARCINOMA. *(Ger.)* Hellriegel, W. (Katharins Hosp., Stuttgart, Germany). *Strahlentherapie* 145(3):243-255, 1973.

5322 FLORID POST-INFLAMMATORY POLYPOSIS OF THE COLON. *(E.)* Botha, J. B. C.; Cawood, D. H. (no affil.). *Suid Afr. Tydskr. Chir.* 11(1):35-37, 1973.

5323 ILEOSIGMOID KNOT AND SIGMOID VOLVULUS. *(E.)* Scott, O. J. (Mpilo Central Hosp., Bulawayo, South Africa). *Suid Afr. Tydskr. Chir.* 11(1):29-32, 1973.

5324 USE OF THE APPENDIX AS A COLON SUBSTITUTE IN VESICOINTESTINAL EXSTROPHY. *(E.)* Castagna, J. T.; Moore, T. C. (no affil.). *J. Pediatr. Surg.* 8(2):331, 1973.

5325 DECREASED INCIDENCE OF POST-APPENDECTOMY WOUND ABSCESSES DUE TO LOCAL APPLICATION OF AMPICILLIN. *(E.)* Hoogbergen, J. A. M. (De Wever Hosp., Heerlen, Netherlands). *Arch. Chir. Neerl.* 25(1):19-25, 1973.

See also, 5002, 5006, 5232, 5237, 5242, 5250, 5254, 5264, 5346, 5468, 5481, 5519.

LARGE INTESTINE

Ulcerative Colitis

5326 HYPOLACTASIA AND ULCERATIVE COLITIS. *(E.)* Pena, A. S.; Truelove, S. C. (Radcliffe Infirm., Oxford, England). *Gastroenterology* 64(3):400-404, 1973.

The disaccharidase activity in British patients with ulcerative colitis did not differ significantly from that found in healthy British volunteers. Of the 72 patients with ulcerative colitis 9 had definite evidence of hypolactasia (12.5%), which is only slightly higher than the incidence in the healthy volunteers, in whom 2 of 21 had hypolactasia (9.5%). By means of serial studies, it was shown virtually all 9 definite hypolactasics appeared permanently deficient in lactase. There were 5 additional patients who showed a temporary reduction in lactase activity during an actual attack of ulcerative colitis. Ulcerative colitis does not appear to cause permanent hypolactasia as the disaccharidase activities were the same in patients with longstanding ulcerative colitis as in patients with a history of less than 1 yr. When the clinical stage of the ulcerative colitis was taken into account, the patients with definite hypolactasia were not distributed at random. The proportion of hypolactasics was low among the patients in clinical remission, was higher in patients with a mild attack, and was higher still in patients with a severe attack. It is suggested that hypolactasia is an important secondary factor in ulcerative colitis which makes the affected patient more prone to suffer from an actual attack of the colitis and for the attack to be severe.

5327 ULCERATIVE POSTDYSENTERIC COLITIS. *(E.)* Fung, W. P.; Monteiro, E. H.; Ang, H. B.; Kho, K. M.; Lee, S. K. (Dept. Clin. Med., Univ. Singapore). *Am. J. Gastroenterol.* 57(4):341-348, 1972.

5328 THE RELATION OF AETIOLOGY TO TREATMENT IN NON-SPECIFIC INFLAMMATORY DISEASE OF THE GUT. *(E.)* Brooke, B. N. (St. George's Hosp., London, England). *J. R. Coll. Surg. Edinb.* 18(3):144-150, 1973.

5329 INFLAMMATORY BOWEL DISEASE. 10 YEARS EXPERIENCE AT THE HOSPITAL OF THE AMERICAN UNIVERSITY AT BEIRUT. *(E.)* Salem, A. A.; Ballas, Z. (American Univ. Hosp., Beirut, Lebanon). *Am. J. Proctol.* 24(3):209-213, 1973.

5330 MUSCULOSKELETAL MANIFESTATIONS OF INFLAMMATORY BOWEL DISEASE. ULCERATIVE AND GRANULOMATOUS COLITIS AND ULCERATIVE PROCTITIS. *(E.)* Palumbo, P. J.; Ward, L. E.; Sauer, W. G.; Scudamore, H. H. (Mayo Clin., Rochester, Minn.). *Mayo Clin. Proc.* 48(6):411-416, 1973.

5331 ADENOACANTHOMA AND ULCERATIVE COLITIS: CASE REPORT AND REVIEW OF THE LITERATURE. *(E.)* Patterson, F. K. (Univ. Tennessee Mem. Res. Ctr., Hosp., Knoxville). *South. Med. J.* 66(6):681-684, 1973.

5332 CHANGES IN MONOSACCHARIDE CONTENT OF MUCOUS GLYCOPROTEINS IN ULCERATIVE COLITIS. *(E.)* Teague, R. H.; Fraser, D.; Clamp, J. R. (Dept. Med., Univ. Bristol, England). *Br. Med. J.* 2(5867):645-646, 1973.

5333 GRANULOMATOUS COLITIS: SIGNIFICANCE OF INVOLVEMENT OF THE TERMINAL ILEUM. *(E.)* Nelson, J.A.; Margulis, A. R.; Goldberg, H. I.; Lawson, T. L. (Univ. California Sch. Med., San Francisco). *Gastroenterology* 64(6):1071-1076, 1973.

5334 EXPERIMENTAL ULCERATIVE DISEASE OF THE COLON IN ANIMALS. *(E.)* Watt, J.; Marcus, R. (Dept. Path., Univ. Liverpool, England). *Gut* 14(6):506-510, 1973.

35 CORRELATION BETWEEN CLINICAL ASPECTS AND LOCATION OF LESION IN CARCINOMA OF THE
ᴧD OF THE PANCREAS. *(E.)* Suzuki, T.; Kuratsuka,
; Uchida, K.; Nagamatsu, Y.; Honjo, I. (Kyoto
lv. Med. Sch., Japan). *Am. J. Surg.* 125(5):
5-550, 1973.

11 patients (6 men and 5 women, aged 41-67 yr)
th carcinoma of the head of the pancreas treated
pancreaticoduodenectomy, the site of the primary
nor was determined. The tumor was located in the
terosuperior area in 3 patients, in the antero-
ferior area in 1 patient, in the posterosuperior
ea in 3 patients, in the posterinferior area in
patients, in the uncinate process in 1 patient,
d in the main pancreatic duct in 1 patient.
l resected lesions originating in the anterior
lf of the head of the pancreas were larger than
5 by 3.0 cm, whereas 4 of the 5 tumors in the
sterior half were smaller. Thus, even though
mors on the posterior surface of the head of the
ncreas are detected at an earlier stage, mainly
e to direct invasion of the portal venous system,
ey already tended to be unresectable. In
ses where the lesion arose some distance from
e bile duct, jaundice was not necessarily pre-
nt, thus eliminating the only definite pre-
erative symptom. Patients with anterosuperior
sions had the longest survival followed by the
tient with the anteroinferior lesion. Patients
th carcinoma of the posterior half of the gland
of the uncinate process died of recurrence with-
as little as 1 yr after surgery. The degree or
tent of invasion of the arteries of the pancreatic
ad, determined by selective arteriography, corres-
nds fairly accurately with the actual morphologic
aracteristics of the lesion.

36 THERAPY AND ORIGIN OF LARGE PANCREATIC PSEUDOCYSTS. *(E.)* Lenggenhager, K.
niv. Bern Sch. Med., Switzerland). *Am. J. Surg.*
5(5):542-545, 1973.

ncreatic pseudocysts in 9 patients (5 men and
women, aged 42-68 yr) were treated by opening
e pseudocyst at a poorly vascularized site and
abbing the inner side with a 20% sodium hydroxide
lution until the wall became corroded and deep
own-black in color. The necrotic pancreatic
questrum, which is often found, must be removed.
e cyst is swabbed dry and washed in physiologic
lution. After suturing, an antibiotic is daubed
to the cyst, and then closure is made. In 7
these 9 patients, primary healing took place
thin 2-4 weeks. The 8th case, in which the
st originally contained 4000 ml of fluid, re-
ired reoperation 3 months later for removal of
ml of fluid. Repeated corrosive treatment
ought definitive healing 10 yr later. Definitive
aling in the last case occurred after 2 months of
eatment. None of the 9 had a recurrence within
e next 4-14 yr. Prior to the development of
e pseudocyst, 8 of the patients experienced
acute, inflammed state in the upper part of the
domen. Cyst development took from 5 weeks to
5 months. The cysts contained from 75-4000 ml of fluid. The following is suggested as a description of cyst development. With each acute injury to pancreatic tissue, trypsinogen is fully activated into trypsin. At this time, highly activated digestive enzymes move freely into the abdomen. In seriously affected cases, at this stage of acute pancreatic necrosis, an actual collapse occurs, during which the vasomotor center suffers toxic damage followed by peripheral acrocyanosis.

5337 ALCOHOLISM WITH NONCIRRHOTIC ASCITES. PANCREATIC ASCITES. *(E.)* Hall, R. C.; Brungard, D. A. (Dept. Surg., State Univ. New York, Syracuse). *N.Y. State J. Med.* 73(11):1319-1321, 1973.

5338 PANCREATIC DISEASE SIMULATING URINARY TRACT DISEASE. *(E.)* Atkinson, G. O.; Clements, Jr., J. L.; Milledge, R. D.; Weens, H. S. (Emory Univ. Sch. Med., Atlanta, Ga.). *Clin. Radiol.* 24:185-191, 1973.

5339 PREVENTION OF POSTOPERATIVE HEMORRHAGE AFTER PANCREATIC CYSTOGASTROSTOMY. *(E.)* Hutson, D. G.; Zeppa, R.; Warren, W. D. (Univ. Miami Affiliated Hosp., Fla.). *Ann. Surg.* 177(6): 689-693, 1973.

5340 CARCINOMA OF THE PANCREAS. *(E.)* Dean, R. H.; Scott, Jr., H. W.; McSwain, B.; Gobbel, W. (Vanderbilt Univ. Sch. Med., Nashville, Tenn.). *South. Med. J.* 66(5):557-561, 1973.

5341 SYMPTOMATIC ADULT ANNULAR PANCREAS. *(E.)* Beachley, M. C.; Lankau, Jr., C. A. (U. S. Patterson Army Hosp., Fort Monmouth, N.J.). *Am. J. Dig. Dis.* 18(5):513-516, 1973.

5342 GASTRIC HETEROTOPIC PANCREAS. A CASE REPORT AND REVIEW OF LITERATURE. *(E.)* Barrocas, A.; Fontenelle, L. J.; Williams, M. J. (U.S. Air Force Med. Ctr., Keesler Air Force Base, Miss.). *Am. Surg.* 39(6):361-365, 1973.

5343 LIPOMATOUS TRANSFORMATION OF THE EXOCRINE PANCREAS IN MUCOVISCIDOSIS. REPORT OF ONE CASE. *(Fr.)* Fontaine, J.-L.; Feigelson, J.; Graveleua, D. (Internatl. Hosp., Univ. Paris, France). *Ann. Paediatr. (Paris)* 49(6-7):567-570, 1973.

5344 CARCINOMA OF THE HEAD OF THE PANCREAS AND PERIAMPULLARY REGION. *(E.)* Baker, R. R.; Roda, C. L. P.; Lee, J. M. (Johns Hopkins Univ. Sch. Med., Hosp., Baltimore, Md.). *Johns Hopkins Med. J.* 132(4):212-221, 1973.

5345 WATERY DIARRHEA AND HYPOKALEMIA DUE TO NONBETA-ISLET CELL HYPERPLASIA OF THE PANCREAS. *(E.)* Jacobs, W. H.; Halperin, P.; Mantz, F. A. (Menorah Med. Ctr., Kansas City, Kans.). *Am. J. Gastroenterol.* 57(4):333-340, 1972.

5346 PANCREATIC PSEUDOCYST COMMUNICATING WITH BOTH THE DUODENUM AND THE COLON. *(E.)* Cosio, F. G.; Onstad, G. R. (Hennepin Company Gen. Hosp., Minneapolis, Minn.). *Am. J. Gastroenterol.* 57(4):353-358, 1972.

5347 PANCREATIC CARCINOMA WITH MULTIPLE METASTASES INTO THE SPINAL CORD. *(Sp.)* Drut, R.; Vestfrid, M. A.; Pawlow, D.; Castedo, C. (Fac. Med., La Plata, Argentina). *Arch. Fund. Roux-Ocefa* 6(1/2):59-63, 1972.

5348 CHARACTERIZATION OF A BLOOD GROUP B GLYCOLIPID, ACCUMULATING IN THE PANCREAS OF A PATIENT WITH FABRY'S DISEASE. *(E.)* Wherrett, J. R.; Hakomori, S.-I. (Dept. Med., Univ. Toronto, Canada). *J. Biol. Chem.* 248(9):3046-3051, 1973.

5349 COMBINED PANCREATICODUODENAL TRAUMA. *(E.)* Anderson, C. B.; Weisz, D.; Rodger, M. R.; Tucker, G. L. (Washington Univ. Sch. Med., St. Louis, Mo.). *Am. J. Surg.* 125(5):530-534, 1973.

5350 APPROACH TO PANCREATIC TRAUMA. *(E.)* Allmendinger, P. D.; Foster, J. H. (Hartford Hosp., Conn.). *Conn. Med.* 37(5):234-237, 1973.

5351 CARCINOMA IN SITU IN THE PANCREAS. *(Rus.* Eshutkin, G. D. (Leningrad Med. Inst., Sanit. Hyg., USSR). *Zdravookhr. Ross. Fed.* (3): 34-37, 1972.

5352 CLOSED PANCREATIC TRAUMA. (CLINICAL CONTRIBUTION). *(It.)* Dalle Vacche, G.; Cinti, C.; Gava, L.; Milano, S. (Munic. Hosp., Belluno, Italy). *Acta Chir. Ital.* 27(4):307-327, 1971.

See also, 5140, 5141, 5161, 5473.

PANCREAS

Pancreatitis

5353 CHRONIC ALCOHOLIC PANCREATITIS. TREATMENT BY DUCTAL OBSTRUCTION. *(E.)* Madding, G. F.; Kennedy, P. A. (Burlingame, Calif.). *Am. J. Surg.* 125(5):538-541, 1973.

Chronic alcoholic pancreatitis in 7 patients (all men, aged 26-54 yr) was treated by ductal obstruction. Of these 7 cases, 2 were complicated by drug addiction. In addition, 1 case of primary carcinoma of the duodenum in a 53 yr old female is reported because it provides information on the histologic changes resulting from ductal obstruction after a period of 32 months. Only 1 patient was in the acute stage at the time of operation. This operation is the equivalent of subtotal pancreatectomy, but will not cause diabetes or peptic ulcers since the islet cells in the tail and body are allowed to remain. Since it is physiologically sound and has advantages not associated with other surgical approaches, complete obstruction of the pancreatic ducts is recommended for the treatment of chronic pancreatitis.

5354 FAMILIAL PANCREATITIS ASSOCIATED WITH HYPERGLYCINURIA. *(E.)* Bergstrom, K.; Hellstrom, K.; Kallner, M.; Lundh, G. (Dept. Clin. Chem., Serafimerlasarettet, Stockholm, Sweden). *Scand. J. Gastroenterol.* 8(3): 217-223, 1973.

A 61 yr old man and his 30 yr old daughter have chronic relapsing pancreatitis. A 10 yr old daughter of the woman has had repeated attacks of epigastric pains during the past year. The character of the pains is compatible with pancreatitis. In the absence of well-known etiologic factors, the disease is considered idiopathic and probably of the hereditary type in all subjects. The 3 patients showed hyperglycinuria and hyperlysinuria, which were not encountered in the healthy members of the family studied. Glycine excretion in the mother averaged 10.8% of the amino acids eliminated in the urine; 7.7 and 6.0% values for the father and daughter, resp. The hyperglycinuria encountered here indicates the presence of some other entity associated with pancreatitis. However,

t has not yet been established whether there is any
tilolgical or pathogenetic relation between amino-
cidurea and pancreatitis.

355 INCIDENCE OF ELEVATED SERUM AMYLASE LEVELS AND PANCREATITIS AFTER UPPER AB-
)MINAL SURGERY. *(E.)* Miller, S. F.; Whitaker, Jr.,
. R.; Snyder, R. D. (Miami Valley Hosp., Dayton,
ıio). *Am. J. Surg.* 125(5):535-537, 1973.

ıe incidence of increased serum amylase levels
:ter upper abdominal surgery was considered in 100
ınsecutive patients. In 5 of the 87 patients who
ıderwent biliary tract surgery, 4 of 72 who
ıd simple cholecystectomy, and 1 of 7 who had
cploration of the common bile duct in addition
) cholecystectomy, the postoperative serum amylase
:vels were elevated (166-2400 U). No postoperative
levation occurred for patients who underwent chole-
rstectomy with operative cholangiogram (4), or with
ıgotomy and pyloroplasty (1). Similarly, no in-
:ease occurred following excision of cystic duct rem-
ınt (1) or bypass operation for carcinoma of the
.liary tract (2). In patients having vagotomy and
:migastrectomy, pyloroplasty, or transabdominal
.atal hernia repair, only the 1 having pyloro-
.asty had elevated amylase levels postoperatively.
ıly 1 patient (cholecystectomy with common duct
cploration) developed clinical symptoms of post-
ıerative pancreatitis. It is suggested that care
ıd gentle handling of tissues can be of help in
ıintaining an acceptable incidence of both post-
ıerative hyperamylasemia and postoperative pan-
:eatitis. There was no history of preexisting
ıncreatic disease in any patient in this series.

56 ACUTE PANCREATITIS. *(Cz.)* Lisicky, J. (OUNZ, Pribram, Czechoslovakia). *Rozhl.*
ir. 51(7):431-435, 1972.

5357 THE TREATMENT OF PANCREATIC PSEUDOCYSTS BY CYSTOGASTROSTOMY. *(E.)* McPherson, F. T. (Street Clin., Vicksburg, Miss.). *J. Miss. Med. Assoc.* 14(5):194-195, 1973.

5358 ACUTE PANCREATITIS CAUSED BY DUODENOPANCREATIC REFLUX. *(It.)* Romano, A.; Pouche, A. (2nd Inst. Clin. Gen. Surg. Surg. Ther., Univ. Parma, Italy). *Ateneo Parmense* 42(6):749-758, 1971.

5359 PANCREATOJEJUNOSTOMY. *(Sp.)* Cartin Montero, B.; Zeledon Perez, M. (San Juan de Dios Hosp., Costa Rica). *Rev. Med. Costa Rica* 39(29):77-86, 1972.

5360 PSEUDOCYST OF THE PANCREAS: UNUSUAL RADIOGRAPHIC PRESENTATIONS. *(E.)* Rosenquist, C. J. (Stanford Univ. Sch. Med., Calif.). *Clin. Radiol.* 24:192-194, 1973.

5361 CLINICAL EVALUATION OF PANCREATITIS. REVIEW OF 120 CASES. *(Sp.)* Ocaranza, J.; Ramirez, E. (Natl. Inst. Nutr., Mexico City, Mexico). *Rev. Invest. Clin.* 24(3):253-262, 1972.

5362 TREATMENT OF ACUTE PANCREATITIS: IN SEARCH OF A RATIONALE. *(E.)* Johnson, R. M.; Barone, R. M.; Gupta, T. K. D.; Newsome, B. (no affil.). *Proc. Inst. Med. Chic.* 29(8):268-269, 1973.

5363 GUIDELINES FOR THE TREATMENT OF ACUTE PANCREATITIS. *(Ger.)* Gulzow, M.; Schoenemann, J.; Zastrow, R.; Diwok, K. (Med. Clin., Univ. Rostock, Germany). *Z. Aerztl. Fortbild.* 65(23):1240-1241, 1971.

See also, 5172, 5283.

LIVER AND BILIARY TRACT

64 HEPATIC PHOSPHORYLASE DEFICIENCY: A BIOCHEMICAL STUDY. *(E.)* Koster, J. F.;
rnandes, J.; Slee, R. G.; Van Berkel, T. J. C.;
lsmann, W. C. (Med. Fac., Erasmus Univ., Rotter-
m, The Netherlands). *Biochem. Biophys. Res.*
mmn. 53(1):282-290, 1973.

ycogen content and liver phosphorylase activity
:e measured in 2 young Turkish brothers suffer-
; from hepatic phosphorylase deficiency (Type
). It was suspected that the 2 patients had debranching enzyme deficiency (glycogenosis Type III) since glucagon administration gave a flat blood sugar response. However, the activity of debranching enzyme was normal in leukocytes; accordingly, the liver exhibited a normal debranching enzyme activity. Liver glycogen content was markedly increased. Phosphorylase activity in leukocytes was quite low in comparison with control values. and was not stimulated by 5'AMP. Phosphorylase activities in the liver tissue were zero, even in the presence of 5'AMP, precluding the possibility that the phosphorylase protein is present in

the inactive *b* form and suggesting that the protein is absent or structurally damaged. Fibroblasts from 1 of the boys exhibited a normal phosphorylase activity, indicating that the enzyme of these cells differs from the hepatic enzyme. It is suggested that the diagnosis of phosphorylase deficiency can be made by investigating leukocyte enzyme activity as well as the pattern of blood glucose changes after glucagon administration. A low leucocyte phosphorylase activity unstimulated by 5'AMP, together with the absence of a hyperglycemic response to glucagon injection, suggests phosphorylase deficiency.

5365 THOROTRAST-INDUCED HEPATOMA PRESENTING AS HYPERPARATHYROIDISM. *(E.)* Kiely, J. M.; Titus, J. L.; Orvis, A. L. (Mary Clin., Rochester, Minn.). *Cancer* 31(6):1312-1314, 1973.

A 43-year-old man presented with right-sided abdominal and flank pain with hypercalcemia. The patient had received i.v. thorium dioxide 27 yr earlier as part of a diagnostic evaluation of jaundice. Hyperparathyroidism was suspected 5 months prior to the current admission and 3 histologically normal parathyroid glands were removed, but no parathyroid tumor was found at surgery. Laboratory tests revealed serum alkaline phosphatase, 30.4 King-Armstrong U; serum bilirubin, 0.9 mg/100 ml indirect; and BSP retention, 14% at 1 hr. An abdominal roentgenogram showed opaque contrast medium in the areas of the liver and spleen, as well as in the midabdominal region over the mesenteric lymph nodes. A percutaneous liver biopsy specimen showed Grade 3 adenocarcinoma of liver cell origin. Autopsy revealed a cirrhotic liver in which the entire left lobe was replaced by a tumor. Large amounts of pigment were noted in the fibrotic bands. Autoradiograms of the liver showed alpha particle tracks in the emulsion over nonmalignant areas but not over the tumor itself. No bone metastatic lesions were found. It is suggested that patients who have received i.v. thorium dioxide be periodically examined for presence of an alpha$_1$-globulin which has been found by immunodiffusion techniques in the serum of carcinoma of the liver patients. Such surveillance may aid in early diagnosis of hepatoma and might allow partial hepatectomy with removal of the tumor.

5366 REYE'S SYNDROME IN BALTIMORE. A REVIEW OF 16 CASES. *(E.)* Walker, S. H.; Schleupner, C. J. (Univ. Maryland, Sch. Med., Baltimore). *Md. State Med. J.* 22(5):48-53, 1973.

A study was made of 16 patients (11 males and 5 females, aged less than 1 yr to 16 yr) with Reye's syndrome in whom the disease was unusually severe and the mortality unusually high. Clinical signs on admission included stupor (5 cases), coma (5), seizure (5), vomiting (1), respiratory distress (1), behavioral changes (4), and history of recent contact with an acute infection (54%). Hepatomegaly and papilledema were noted in about half the cases. The 2 survivors among the 16 cases did not present with stupor, coma, seizure, vomiting, or respiratory distress. In surviving patients, the range of total serum bilirubin was 0.3-1.8 mg/100 ml and SGOT was 12-1000 Karmen U/ml. In fatal cases, total serium bilirubin was 0.2-4.4 mg/100 ml and SGOT was 76-2700 Karmen U/ml. Serum glucose and cerebrospinal fluid glucose concentrations were significantly higher in fatal cases ranging from 16-350 mg/100 ml and 20-138 mg/100 ml, resp. There was no evidence that use of a particular agent contributed to survival. Most patients were treated with steroids (dexamethazone, prednisone, and hydrocortisone 21-sodium succinate) and antibiotics (neomycin, ampicillin, chloramphenicol, methacillin, penicillin, kanamycin, and oxacillin). Anticonvulsants were used in 9 cases and osmotic diuretics in 5. Isolation of influenza B virus and varicella-zoster virus in patients in this series suggests these viral agents may precipitate Reye's syndrome.

5367 HISTOCHEMICAL ENZYME PATTERN IN THE DIABETIC LIVER. *(Ger.)* Kautzsch, E. (Munic. Hosp., Munchen-Oberfohring, Germany). *Med. Klin.* 67(7):230-232, 1972.

Succinate and glutamate dehydrogenase, LDH, and alkaline and acid phosphatase activities were determined in punch biopsies taken from the livers of 12 diabetics with normal liver histology, 51 diabetics with fatty liver, and 50 patients with fatty liver and no evidence of diabetes. The activities of cytoplasmic LDH and mitochondrial succinate and glutamate dehydrogenases were reduced in only 10-30% of the patients in these 3 groups. Decreases were most common in diabetics with normal livers and least common in patients with fatty liver and no evidence of diabetes. Thus, the enzyme pattern in diabetic livers differs from that in normal liver cells. Similarly, alkaline phosphatase activity was increased more often in the sinusoid boundaries in diabetics with normal livers than in nondiabetics with fatty liver. ATPase activity was increased in diabetics with normal livers; the increase was even more marked in diabetics with fatty liver. Acid phosphatase activities were increased primarily in Kupffer's cells; these increases were most common in diabetics with normal livers.

5368 ANATOMOPATHOLOGICAL CHANGES IN THE KIDNEY IN ACUTE AND CHRONIC LIVER DISEASE (REVIEW OF 1600 AUTOPSIES). *(Sp.)* Rodriguez Ocampo, O. (no affil.) *Rev. Med. Costa Rica* 39(29):153-156, 1972.

An analysis was made of renal lesions in 35 patients, autopsied between 1951 and 1966, who had liver disease with no history of renal disease. Diagnoses established on these 35 patients (25 males and 10 females) included cirrhosis (21 cases), hepatic necrosis caused by viral hepatitis (7), fatty liver (2), hepatic abscesses (4), and multiple focalized subacute hepatitis (1). No renal lesions were found in 15 of the 21 cirrhotics; the other 6 patients had capillary proliferation and mesangial thickening

the glomeruli. Tubular necrosis was detected
3 cases and vacuolization of the tubular
thelium in 2. Of the 7 patients with viral
atitis, 3 had normal kidneys; renal lesions
luded mesangial thickening (2 cases) and
illary proliferation (1 case) in the glomeruli
tubular necrosis (2 cases), vacuolization of
tubular epithelium (2 cases), and bilirubin
osits in the tubules (4 cases). In contrast
some reports in the literature, cirrhotics
mined here had nonspecific renal changes which
ht be either secondary to the cirrhosis or the
ult of glomerulonephritis. Other types of
al lesions were found which were related to
ertension and electrolyte imbalance, particular-
hypokalemia.

9 HEMOSTATIC PROBLEMS IN LIVER SURGERY. *(E.)* Ro, J. S. (Univ. Hosp., Oslo,
way). *Scand. J. Gastroenterol.* 8(S 19):
81, 1973.

main changes in coagulation and fibrinolysis
er different types of liver surgery are
cribed. Marked alterations often occur, but
gerous hemostatic defects are seldom encoun-
ed after suture, resection (even extensive
ection), and portal decompression procedures.
ever, extensive consumption coagulopathy is a
siderable threat following transplantation and
racorporeal, heterologous liver perfusion.
per surgical technique, with particular re-
d to surgical hemostasis, and adequate evalua-
n of the hemostatic situation are important
tors concerning the prevention of hemostatic
blems both pre- and postoperatively.

PRIMARY LIVER TUMORS IN CHILDREN. *(Rus.)* Kushch, N. L.; Kononuchenko, V. P.;
chenko, L. I. (Donetsk Med. Inst., USSR). *Vestn.*
r. (5):67-71, 1972.

mary liver tumors were diagnosed in 11 children,
d 1 month to 4 1/2 yr. These tumors included
rimary carcinomas, 3 hemangiomas, 1 sympathico-
stoma, and 1 hemangioendothelioma. Most
ients had no overt signs of liver disease:
y 1 of the 11 developed jaundice shortly before
th. Hemoglobin fell to 50 U in 1 patient with
ernal bleeding; autopsy showed a defect in the
l of the hepatic vein just before it passed into
lower lobe of the liver and a sympathico-
stoma of the liver with metastases in the lungs,
h nodes, mesentery, and right atrium. The
er 10 patients had hemoglobin levels of 64 to
J. The WBC was elevated in 2 patients and
in normal limits in 9. Erythrocyte sedimen-
ion rates ranged from 4-26 mm/hr and, in 2
ients increased to 65 mm/hr. The tumor was
alized in one lobe of the liver in only 2 of
11 patients; these localized tumors were
oved. Only 1 of the 6 primary carcinomas was
alized; the patient is alive 5 yr after its
oval. Multiple tumors, which were inoperable,
e found in the other patients at laparotomy.

5371 A CASE OF ZELLWEGER'S SYNDROME (HEPATO-CEREBRO-RENAL SYNDROME). *(Fr.)* Vincens, A.; Guillat, J.-C.; Gatin, G.; Rodier, J.; Graveleau, D. (Internatl. Hosp., Univ. Paris, France). *Ann. Pediatr.* 49(6-7):553-560, 1973.

5372 SPONTANEOUS RECOVERY OF A PATIENT WITH PRIMARY LIVER SARCOMA. *(E.)* Rill, A. (Military Hosp., Sarajevo, Yugoslavia). *Acta Med. Iugosl.* 26(2):159-167, 1972.

5373 SUCCESSFUL TREATMENT OF HEPATIC COMA, COMPLICATED BY RENAL FAILURE, WITH EXCHANGE TRANSFUSION AND PERITONEAL DIALYSIS. *(E.)* York, E. L.; Grieve, S.; Mieny, C. J. (Coronation Hosp., Johannesburg, South Africa). *S. Afr. Med. J.* 47(15):655-656, 1973.

5374 IMMUNOTHERAPY FOR AUSTRALIA-ANTIGEN-ASSOCIATED HEPATOMA. *(E.)* Ziegenfuss, J. F. (Dept. Med., Jefferson Univ., Philadelphia, Pa.). *Lancet* (7816):1365-1366, 1973.

5375 STUDIES ON HYPOGLYCAEMIA IN PRIMARY CARCINOMA OF THE LIVER. A CASE REPORT AND REVIEW OF PATHOGENETIC MECHANISMS. *(E.)* Vinik, A. I.; Deppe, W. M. (Dept. Med., Univ. Cape Town, South Africa). *S. Afr. Med. J.* 47(12):518-524, 1973.

5376 AUTO-IMMUNE LIVER DISEASE. *(E.)* Eddleston, A.; Smith, M. (no affil.). *Medicine (Baltimore)* 7:551-556, 1972-1973.

5377 METASTATIC CANCER OF THE LIVER RESULTING IN OBSTRUCTION OF THE EXTRAHEPATIC BILE DUCT. *(E.)* Takasan, H.; Kitamura, O.; Ozawa, K.; Honjo, I. (Kyoto Univ. Fac. Med., Japan). *Am. J. Surg.* 125(6):782-785, 1973.

5378 EFFECT OF AFLATOXIN IN ANIMALS AND IN MAN. *(Ger.)* Bosenberg, H. (Hygiene Inst., Munster Univ., Germany). *Z. Lebensm. Unters. Forsch.* 151(4):245-249, 1973.

5379 DIETARY TREATMENT OF HEPATIC DISEASES. *(E.)* Davidson, C. S. (Boston City Hosp., Mass.). *J. Amer. Diet Assoc.* 62(5):515-519, 1973.

5380 OSTEOMYELOFIBROSIS DEVELOPING INTO SPLENO-HEPATIC FIBROSIS OVER A 21-YEAR PERIOD. *(Fr.)* Vannotti, A. (Med. Clin., Univ. Lausanne, Switzerland). *Schweiz. Med. Wochenschr.* 102(9): 302-304, 1972.

See also, 4954, 5121, 5130, 5131, 5132, 5142, 5144, 5160, 5161, 5175, 5177, 5288, 5902, 5491, 5494, 5503, 5505, 5506, 5509, 5510, 5517.

LIVER AND BILIARY TRACT

Hyperbilirubinemic States

5381 POST-ANAESTHETIC JAUNDICE DUE TO GLUCOSE-6-PHOSPHATE DEHYDROGENASE DEFICIENCY. *(E.)* Shapley, J. M.; Wilson, J. R. (Dept. Anaesthesia, Univ. Toronto, Canada). *Can. Anaesth. Soc. J.* 20(3): 390-392, 1973.

A 27 yr old male was hospitalized with chronic serous otitis media for a left tympanoplasty. Following induction of anesthesia, the patient received 1.5% methoxyflurane with nitrous oxide and oxygen at a ratio of 4:2 liters/min. Maintenance for 4½ hr was carried out with 0.75% methoxyflurane. There was more than the usual amount of bleeding at the time of incision. No other unusual events were noted. The patient became jaundiced the second day after operation and increased unconjugated bilirubin suggested prehepatic jaundice. Liver biopsy performed 13 days postoperatively revealed histological features of a mild degree of hepatic cellular damage, associated with increased stainable iron, and a differential diagnosis of mild viral hepatitis or hepatocellular damage due to a toxic drug was made. Bone marrow biopsy revealed mild erythroid hyperplasia. The patient was found to be completely deficient in glucose-6-phosphate dehydrogenase. The jaundice appeared to be explainable on the basis of hemolysis. More than 40 drugs are known to produce hemolysis in subjects deficient in glucose-6-phosphate dehydrogenase. It is suggested that the etiology of cases of jaundice following anesthesia, particularly with fluorinated agents, be explored in detail.

5382 ISOENZYME SPECTRUM OF LACTATE DEHYDROGENASE IN NEONATES WITH PHYSIOLOGICAL BILIRUBINEMIA. *(Rus.)* Egorova, A. I.; Davydovskii, A. A.; Nugumanova, G. B. (Leningrad Pediatr. Med. Inst., USSR). *Vopr. Okhr. Materin. Det.* 17(8):36-39, 1972.

5383 PHOTOCHEMICAL METHOD OF TREATING HYPERBILIRUBINEMIA IN PREMATURE NEONATES. *(Rus.)* Punchenok, N. A. (Inst. Obstet. Gynecol., Leningrad, USSR). *Vopr. Okhr. Materin. Det.* 17(8):33-36, 1972.

5384 PRURITUS AND CHOLESTATIC JAUNDICE DUE TO SECONDARY SYPHILIS. *(E.)* Sarkany, I. (Roy. Free Hosp., London, England). *Proc. R. Soc. Med.* 66(3):237-238, 1973.

See also, 5065, 5068, 5079, 5169, 5438, 5480.

LIVER AND BILIARY TRACT

Nonviral Hepatitis and Hepatic Injury

5385 METHYLDOPA-INDUCED SUBMASSIVE HEPATIC NECROSIS. *(E.)* Rehman, O. U.; Keith, T. A.; Gall, E. A. (Cincinnati Gen. Hosp., Ohio). *J. A. M. A.* 224(10):1390-1392, 1973.

A 51 yr old black woman was hospitalized with a history of recurrent jaundice, nausea, and vomiting. Hypertension had first been documented 20 yr earlier and treatment with reserpine, hydralazine

irochloride, chlorothiazide, and chlorthalidone
s begun. Eleven months prior to the current
nission, methyldopa (250 mg twice daily increased
250 mg 3 times/day after 2 weeks time) was pre-
ribed. Chlorothiazide and spironolactone were
so given at this time. Prior to methyldopa
erapy, liver function tests were normal. After
nonths of therapy, nausea, vomiting, abdominal
in, and jaundice were noted. Laboratory evidence
hepatic dysfunction appeared: SGOT 850 mμ/ml,
250 mμ/ml, and serum bilirubin 4.5 mg/100 ml.
thdrawal of methyldopa resulted in patient
rmalizing in 6 weeks time. After 6 months methyl-
a (250 mg 3 times/day) was again prescribed for
ertension and in 9 weeks hepatic dysfunction
urned: SGOT 2,800 mμ/ml, SGPT 1,200 mμ/ml,
650 mμ/ml, and serum bilirubin 16 mg/100 ml.
spite withdrawal of methyldopa, the patient
sened and 6 days prior to death a liver biopsy
vealed hepatitis with centrilobular fallout and
crosis. Serum bilirubin rose to 40 mg/100 ml at
ith. Necropsy revealed the previously noted
ion had progressed to submassive centrilobular
crosis and collapse. The peripheral rim of
atic cells was "ballooned" with foamy cyto-
ısm due to fat. The lobule center showed con-
ised reticulin with early collagenization. Moderate
tal fibrosis with no interlobular connection or
lule formation was present. Inflammatory cells
e seen in portal areas. This patient was non-
oholic and had no i.v. infusion or contact with
aundiced individual. Viral hepatitis was excluded
the autopsied liver specimen contained an abund-
e of lipid. It seems likely that the submassive
atic necrosis seen here was the ultimate result
the use of methyldopa.

6 HUMAN RADIATION HEPATITIS. A MORPHOLOGIC STUDY WITH EMPHASIS ON THE LATE CHANGES.
) Lewin, K.; Millis, R. R. (Stanford Univ. Sch.
., Calif.). *Arch. Pathol.* 96(1):21-26, 1973.

pathologic findings of 19 autopsied cases of
iation hepatitis fall predominantly into 3 groups:
te, chronic, and intermediate, although there is
e overlap among them. Radiation was administered
tially for malignant lymphoma in the majority of
cases, carcinoma of the esophagus and pancreas
metastatic ovarian carcinoma in the remainder.
The changes caused by acute radiation hepatitis are similar to those previously described, but an additional feature, namely, intrasinusoidal and extrasinusoidal reticulin proliferation was noted. The changes of chronic radiation hepatitis are characterized by a shrunken atrophied liver showing lobular collapse and distortion, portal tract fibrosis, and persistence of vascular damage. Intermediate cases show changes of both the acute and chronic groups. Thus, in the majority of intermediate cases, variable degrees of hyperemia, hepatic vein changes, and portal tract fibrosis were seen, but collapse of the lobular architecture was not a common feature. In these 19 cases, acute changes were seen more often following doses up to 4000 rads and within 3 months of radiation exposure. The chronic changes occurred in patients receiving higher doses with longer postradiation survival. However, exceptions to this finding indicate the dose dependence is not a constant factor. No significant differences were found between those 10 patients treated with radiation alone and the 9 treated with chemotherapy and radiation. Severe liver dysfunction occurred only in cases of acute and intermediate radiation hepatitis and not in chronic cases. It is suggested that the severity of the clinical syndrome is not well correlated with the extent of morphologic change.

5387 CHLORAMBUCIL-INDUCED JAUNDICE. *(It.)* Morgano, G.; Patrone, E. (Ventimiglia Hosp., Italy). *Fegato* 18(1):39-42, 1972.

5388 EFFECTS OF VITAMIN E ON TOXICODERMA ASSOCIATED WITH LIVER DAMAGE. CASE REPORT. *(E.)* Fujii, T. (Saiseikai Utsunomiya Hosp., Japan). *Keio J. Med.* 21(2):105-111, 1972.

See also, 5069, 5135, 5473.

LIVER AND BILIARY TRACT

Acute Viral Hepatitis

FULMINANT HEPATITIS DUE TO HERPES HOMINIS IN AN ADULT HUMAN. *(E.)* Francis, T. I.;
itokun, B. O.; Kemp, G. E. (Dept. Med., Univ.
lan, Nigeria). *Am. J. Gastroenterol.* 57(4):
-332, 1972.

A 39 yr old Caucasian male presented with symptoms of fever, headache, watery diarrhea, vomiting, and a cough producing small quantities of whitish sputum. Packed cell volume was 43%; white cell count, 2900/cu mm; erythrocyte sedimentation rate, 42 mm the first hr. No pathogenic protozoa or helminthic ova were found in stool specimens; cultures were negative for salmonella or shigella organisms. Typhoid fever was the assumed diagnosis and i.v. fluids and chloramphenical therapy were started. Steroids were added. Death from massive liver necrosis came 3 days after admission. At autopsy, the soft, flabby liver weighted 1545 gm, and contained large areas of dark brown mottling. Diffuse and extensive necrosis of hepatocytes in centrizonal and midzonal areas existed. Those periportal hepatocytes nearest necrotic ones showed fatty change, multinucleated giant cell forms, occasional intranuclear inclusion bodies, and some brown cytoplasmic pigment. Sinusoids in the nonnecrotic areas contained hypertrophic Kupffer cells. Portal tracts had infiltrates of mononuclear cells. Kidneys showed changes of extensive acute tubular necrosis, particularly the proximal and distal convoluted tubules. Adrenals showed focal areas of cortical necrosis. The spleen was deeply congested and enlarged. Hilar glands were slightly enlarged. The characteristic hepatic lesion with inclusion bodies in the transitional zones between areas of necrosis and surviving parenchymal cells is compatible with the clinical diagnosis and with the laboratory isolation of *Herpes virus hominis* from the liver tissue. It is suggested that corticosteroids be avoided and a trial of gamma globulin and idoxuridine be given the few adults who may present with visceral complications of *herpes simplex* infection.

5390 EFFECTS OF HYDROCORTISONE ON MURINE HEPATITIS VIRUS REPLICATION AND CELL INJURY IN CULTURED LIVER CELLS AND MACROPHAGES.

(E.) Sabesin, S. M. (Jefferson Med. Coll., Philadelphia, Pa.). *Am. J. Gastroenterol.* 57(6):485-519, 1972.

The effects of hydrocortisone on the cell injury produced by the replication of murine hepatitis virus (MHV) was studied in cultured cells derived from mouse liver and in mouse peritoneal macrophages. The results indicated a differential effect of hydrocortisone on cell injury produced by MHV in the 2 cell types. In cultured liver cells, hydrocortisone protected against cytophatic effects while in macrophages the addition of hydrocortisone enhanced cell injury following infection with MHV. The protective or deleterious effects of hydrocortisone treatment were related to enhanced viral replication in macrophages and inhibition of viral growth in liver cells. These effects could be elicited with doses of hydrocortisone between 1-20 μg/ml. of culture medium and were evident with a wide range of input multiplicity of MHV. Similar results were obtained when hydrocortisone was added 24 hr before, simultaneously, or 2 hr after infection with MHV. Less prominent effects were obtained when the corticosteroid was added 24 hr after infection. The corticosteroid effects were observed with 2 strains of MHV-A59 and -S and protective effects in liver cells were obtained in cultures grown continuously in the presence of hydrocortisone for months prior to infection. The mechanism of the differential effect of hydrocortisone on MHV in the 2 cell types is not, understood. However, possible differential effects of corticosteroids on interferon action in the 2 cell types or modification of viral release from infected cells are among the many possible explanations.

5391 DECREASED INCIDENCE OF TRANSFUSION HEPATITIS AFTER EXCLUSIVE TRANSFUSION WITH RECONSTITUTED FROZEN ERYTHROCYTES. STUDIES IN A DIALYSIS UNIT.

(E.) Carr, J. B.; de Quesada, A. M.; Shires, D. L. (VA Hosp., Indianapolis, Ind.). *Ann. Intern. Med.* 78(5):693-695, 1973.

Mild anicteric hepatitis occurred in 19 of 43 nemodialysis patients (44%) who received whole blood or unwashed packed cells before the exclusive use of reconstituted frozen erythrocytes for transfusion was instituted. These patients received an average of 12.5 units of blood during 9.5 months before developing hepatitis. In contrast, only 1 case of hepatitis developed in a group of 13 patients who received nothing but reconstituted frozen erythrocytes. They received an average of 11 units of frozen cells during 13 months. Patients (11) who received no blood had no hepatitis. Coincident with the many hepatitis cases among the patients, 15 cases of hepatitis occurred in 59 dialysis staff members. All infected staff members had a direct professional connection with the blood of the patients and these staff members had severe icteric hepatitis with prostration, severe nausea and vomiting, severe anorexia and often hives or arthralgia. Substantiation of the theory that serum hepatitis may be transmitted by means other than blood is noted in the case of the wife of one of the staff physicians. The wife became ill with HB Ag-positive hepatitis. However, it is felt in this series of cases that the most likely source of infection was the use of whole blood or unwashed packed cells.

5392 ALPHA$_1$ FETOPROTEIN AND ANTIALPHA$_1$ FETOPROTEIN IN ACUTE VIRAL HEPATITIS.

(E.) Florin-Christensen, A.; Arana, R. M. (Ctr. Med. Educ. Clin. Invest., Buenes Aires, Argentina). *Br. Med. J.* 2(5858):94-95, 1973.

A 26-yr-old woman was diagnosed as having acute viral hepatitis by clinical symptoms and serum bilirubin, LDH, and transaminase activities. Hepatitis-associated antigen was present until the 3rd week, but hepatitis-associated antibody was never found. The latex fixation test became positive 1 week after symptoms began and still showed a titer of 1:640 by the 2nd week. Much mixed cryoprecipitate appeared in the 2nd week which consisted entirely of α_1-fetoprotein (α_1-FP) and IgMK, suggesting the possibility of an immune complex precipitate; anti-α_1-FP was present in 1 sample. Although α_1-FP has been reported in a few cases of acute viral hepatitis, this is believed to be the first report of naturally occurring human anti-α_1-FP. The mechanism by which autologous α_1-FP behaves as an antigen eliciting autoantibodies could be the bypassing

che T-cell system control caused by the viral
cession.

3 PURIFICATION AND BIOPHYSICAL CHARACTERIZATION OF HEPATITIS B ANTIGEN. *(E.)*

, C. Y.; Tilles, J. G. (Boston City Hosp., Mass.).
lin. Invest. 52(5):1176-1186, 1973.

atitis B antigen (HB Ag) was purified from
n serum proteins by a method based on its
ative resistance to pepsin digestion. Fur-
purification included equilibrium sedimenta-
n on both sucrose and cesium chloride density
lients. The following properties were deter-
ed before and after purification and found to
naltered: sedimentation coefficient, 40.2
$_{0,w}$); buoyant density, peaks on sucrose and
um chloride of 1.170 and 1.216 g/ml, resp.,;
trophoretic mobility; and particle size, 14-
m in diameter. The diffusion coefficient
molecular weight of purified HB Ag were 2.278
$^{-7}$ cm^2/s and 2.4 x 10^6, resp. The purified
g stained with protein and lipid dyes and
stain as well, suggesting that HB Ag also
ains carbohydrate. Since the sedimentation
ficient and molecular weight values are much
ler than those for any known virus, and since
ses the size of HB Ag have a higher density
to greater relative contribution of nucleic
in particles of that size, it is suggested
the purified particles are probably in-
lete virus. This would also explain the
ing of only about 1% nucleic acid in these
icles.

ELECTRON MICROSCOPE STUDY OF A CASE OF AUSTRALIA ANTIGEN-POSITIVE CHRONIC HEPA-
S. *(E.)* Almeida, J. D.; Gioannini, P.;
ise, G.; Harrison, C. V. (Roy. Postgrad. Med.
, London, England). *J. Clin. Pathol.* 26:113-
1973.

se of Australia antigen (Au-Ag) positive chronic
titis in a 4 yr old boy is presented. The boy
hospitalized with jaundice and anorexia with the
owing abnormal characteristics: SGOT 100 U, SGPT
U, and bilirubin 1.5 mg%. Four months after re-
ry, he complained of anorexia, asthenia, and
ralgias and tests indicated SGOT 335 U, SGPT
U, and bilirubin 0.5 mg%. Electron microscope
ination of thin sections of liver revealed the
ence of 200 Å particles in the nuclei of hepato-
s. These particles appeared identical to those
iously described in specimens of Au-Ag-positive
r tissue but differed in their distribution. No
ily infected nuclei were found although almost
nuclei contained the particles. False negatives
have been obtained because intranuclear particles
smaller than the thickness of most sections for
tron microscopy. It is also possible that serum
titis virus enters into other than a lytic rela-
with host cells. Partial integration of the
l genoma in the host could occur, resulting in
little mature virus production but with vari-
amounts of Au-Ag being expressed. After recovery, betamethasone (0.5 mg/day) was prescribed. A relapse followed withdrawal of this immunosuppressive agent and necessitated maintenance therapy with azathioprine (50 mg/day). Although the patient was not given corticosteroids initially, he developed measles after his original attack of hepatitis. It is possible that measles, which produces immunosuppression, allowed serum hepatitis to enter its prolonged course.

5395 MULTIPLE ATTACKS OF HEPATITIS IN DRUG ADDICTS: BIOCHEMICAL, IMMUNOCHEMICAL, AND MORPHOLOGIC CHARACTERISTICS. *(E.)*

Iwarson, S.; Lundin, P.; Holmgren, J.; Hermodsson, S. (Inst. Med. Microbiol., Goteborg, Sweden). *J. Infect. Dis.* 127(5):544-550, 1973.

In 27 addicts, aged 16-27 yr, who had used amphetamine i.v. for 6-36 months, 3 different types of immunochemical response were noted in association with recurrent attacks of jaundice. Type I was characterized by high levels of IgM (360-490%) in serum but no demonstrable hepatitis B antigen (HB Ag) in serum, while another type (II) was associated with this antigen in serum and with moderately elevated levels of IgM (102-388%) and IgG (102-240%). Both types were associated with the classical histopathologic picture of viral hepatitis. According to results of previous studies on immunoglobulins in viral hepatitis, type I is assumed to represent hepatitis A, while the presence of HB Ag in serum (type II) is considered indicative of hepatitis B. The third type of immunochemical response was characterized by almost normal levels of IgM and no demonstrable HB Ag in serum. In biochemical tests of liver function, the type III reaction was associated with high maximal SGPT levels but a significantly shorter duration of abnormal transaminase activity as compared with type I and II. The type was also associated with a different histopathologic picture, including Kupffer-cell reaction and lobular infiltration of groups of mononuclear inflammatory cells, but no obvious damage to the parenchymal cells.

5396 ROLE OF ARTHROPODS IN TRANSMISSION OF HEPATITIS-B VIRUS IN THE TROPICS. *(E.)*

Brotman, B.; Prince, A. M.; Godfrey, H. R. (New York Blood Ctr., N.Y.). *Lancet* (7815):1305-1308, 1973.

Hepatitis-B antigen (HBAg) was detected by radioimmunoassay in 17% of engorged mosquitoes and in 1 out of 18 pools of engorged bed bugs caught in the Ivory Coast. Antigen was not found in any pools of gravid or unfed mosquitoes or bed bugs or in any pools of phlebotomine sand flies, black flies, or tsetse flies tested. Of Ivoiriens living in villages where insect collections were made, 6.5% (20/30g) had HBAg detectable by radioimmunoassay. Of Africans up to 30 yr of age, 7.2% had detectable HBAg compared with 2.2% of Africans over 30 yr of age. Detection of antigen in engorged insects but not in gravid or unfed insects suggests that replication of the virus does not occur in these arthropods but that mechanical transmission to the human host may occur. Although it is questionable whether control of blood-sucking insects would significantly affect the high rate of exposure to hepatitis-B infections among indigenous populations, blood-sucking insects may serve as important vectors of infection among visitors to tropical regions.

5397 SPECIFICITY OF THE DIRECT SOLID-PHASE RADIOIMMUNOASSAY FOR DETECTION OF HEPATITIS-B ANTIGEN.

(E.) Prince, A. M.; Brotman, B.; Jass, D.; Ikram, H. (New York Blood Ctr., N.Y.). *Lancet* (7816):1346-1350, 1973.

In 5089 volunteer donor bloods screened by 2 methods, the "Ausria" (Abbott Laboratories) direct solid-phase radioimmunoassay test detected 10 times as many positive reactions as did counterelectrophoresis. The specificity of these reactions was investigated by preincubating sera with hepatitis-B antibody (HBAb), normal guinea pig serum, or normal human serum, to attempt neutralization. In 21% of 81 sera which had been negative on counterelectrophoresis, the radioimmunoassay was positively specific for the hepatitis-B antigen (HBAg), as indicated by clearcut neutralization by HBAb. However, in 42% of these sera, the radioimmunoassay positivity was probably due to cross-reacting antiguinea pig globulin antibodies since the reaction was neutralized by normal guinea pig serum. The radioimmunoassay positivity of remaining sera could not be clearly neutralized by HBAb or by guinea pig serum, and hence was probably also not HBAg specific. These results were supported by post-transfusion follow-up studies: transfusion of HBAg-specific radioimmunoassay-positive blood resulted in serological evidence of hepatitis-B infection in 13 of 15 recipients whereas transfusion of non-HBAg-specific radioimmunoassay-positive blood resulted in infection in only 1 of 18 recipients. Antisera against immunoglobulins of 6 different species showed strong (false) positivity in the "Ausria" radioimmunoassay test. Thus antibodies to ingested globulins (e.g., of porcine, ruminant, or avian origin) cross-react sufficiently with the guinea pig immunoglobulins used in this test to produce nonspecific results. However, it is emphasized that the "Ausria" technique detected 2-3 times as many HBAg carriers among blood donors as did routine counterelectrophoresis.

5398 SPECIFIC NEUTRALIZATION OF HUMAN HEPATITIS TYPE A IN MARMOSET MONKEYS.

(E.) Holmes, A. W.; Deinhardt, F.; Wolfe, L.; Froesner, G.; Peterson, D.; Casto, B.; Conrad, M. E. (Rush-Presbyterian-St. Luke's Med. Ctr., Chicago, Ill.). *Nature* 243(5407):419-420, 1973.

Specific neutralization by convalescent human serum of the hepatitis type A agents transmitted from man to marmosets has been demonstrated. The inoculation of coded human specimens obtained during the acute phase of hepatitis regularly caused hepatitis in marmosets whereas control or preinfection serum or plasma did not. Cross challenge of marmosets with various hepatitis isolates showed there were at least 2 different antigenic types of hepatitis A viruses. In order to neutralize the disease in marmosets with convalescent human serum, acute phase serum or plasma from human volunteers inoculated with MS-1 strain of human hepatitis, or the infectious fractions of such serum or plasma prepared by density gradient centrifugation in caesium chloride, were mixed in a 1:1 ratio with preinoculation or convalescent serum from 1 of the volunteers. After incubation, 0.5 ml of the mixtures were inoculated i.v. into groups of marmosets. Neither human serum albumin nor preinoculation serum inhibited the infectivity of the acute phase serum or its infections fraction, whereas the convalescent serum neutralized the infectivity of these inocula almost completely. It is thus established that human hepatitis type A viruses can be transmitted to some species of marmosets, including biochemically and morphologically typical hepatitis. The need for human volunteers in most further studies of hepatitis A is therefore eliminated and the complete identification of and preventive measures against hepatitis type A viruses is likely in the foreseeable future.

5399 EFFECTS ON PLANTS OF SERA FROM PATIENTS WITH HBAg-ASSOCIATED HEPATITIS.

(E.) Banatvala, J.; Payne, C. (St. Thomas's Hosp., London, England). *Lancet* (7816):1359-1360, 1973.

Sera from 13 of 14 patients in the acute phase of hepatitis B antigen (HBAg)-associated serum hepatitis induced necrotic changes in the leaves of tobacco (*Nicotiana sylvestris*) plants. This effect was also induced by 6 of 11 sera obtained from apparently healthy HBAg carriers. No effect was induced by sera from patients with HBAg-negative infectious hepatitis, sera from patients with obstructive or hemolytic jaundice, or sera from patients with HBAg hepatitis which had been heat-inactivated. Neutralization tests revealed that inhibitory activity was present in sera from 2 patient who had recently recovered from HBAg-associated serum hepatitis. These results confirm that sera from patients with HBAg-associated hepatitis induce changes in plants, but it cannot yet be stated that this results from virus transmission. The changes may arise from the presence of some toxic factor; if so, this toxicity seems specifically associated with sera from patients with acute serum hepatitis as well as from some HBAg-carriers. No mottling or systemic vein clearing was observed.

5400 BIOCHEMICAL FINDINGS COMPARED WITH HISTOLOGIC OBSERVATIONS IN CARRIERS OF HEPATITIS B ANTIGEN.

(E.) Papadopoulos, N. M.; Traianos, G. P.; Thomakos, A. P.; Tiniakos, G. (Natl. Hellenic Res. Fdn., Athens, Greece). *Proc. Soc. Exp. Biol. Med.* 143(2):323-325, 1973.

A group of 31 clinically asymptomatic HB Ag carrier were voluntarily hospitalized and subjected to clin ical examination and liver biopsy. The presence of slight hepatomegaly in the majority of the cases was the only clinical sign revealed by physical examination. Histological evaluation of the biopsy revealed no histologic abnormality in 2 cases and m phologic changes in 29. Moderate chronic portal

lammation and parenchymatous reaction existed in
ases and slight inflammatory infiltrations main-
in the portal tracts in the remaining 25. In
carriers SGPT was higher than normal, ranging
37-190 Wroblewski U. An increased density of
isozyme-5 was noted in 45% of the carriers.
68% IgG was 1600-2200 mg/100 ml. It is not cer-
n whether these increased activities are transient
associated with persistent antigenemia. Results
icate that there are definite histologic and
chemical abnormalities in carriers.

1 COAGULATION ABNORMALITIES IN ACUTE LIVER
FAILURE: PATHOGENETIC AND THERAPEUTIC
LICATIONS. *(E.)* Clark, R.; Rake, M. O.;
te, P. T.; Williams, R. (King's Coll. Hosp.,
don, England). *Scand. J. Gastroenterol.* 8(S19):
70, 1973.

eries of 40 patients with fulminant hepatic
lure was studied. Bleeding occurred in 29 pa-
nts, 6 of whom did not require transfusion.
14 of the remaining 23 bleeding caused death.
dence of esophagitis or erosions in the eso-
gus, stomach, and duodenum was seen at autopsy,
luding one acute duodenal ulcer. In 46% of
patients thrombocytopenia was present. Thus
suggestion that coagulation factors were re-
d at a faster than normal rate was examined as
possible cause for bleeding. The mean maximum
es recorded for prothrombin time and partial
mboplastin time in all patients (expressed as
os with normal controls) were 4.8 and 2.2 sec,
., indicating severe synthetic failure. Throm-
clotting time was considerably prolonged. Mean
ma fibrinogen level was 140 mg/100 ml, and mean
ma plasminogen value in 12 patients was very
at 0.9 casein U/ml. Fibrin degradation products
detected in 28 of 36 patients. These findings
cate disseminated intravascular coagulation.
cause of fulminant hepatic failure in these
ents included fulminant viral hepatitis, hepa-
xins or drug hypersensitivity, and particularly
ge by suicidal doses of paracetamol. A
y of 36 paracetamol cases revealed some in-
t into the disturbance of coagulation mechan-
The prothrombin time is a valuable prog-
ic index and the synthesis of coagulation fac-
fails early except for fibrinogen, with intra-
ular coagulation occurring in all but those
minor degrees of hepatic damage. Heparin
apy in small intermittent amounts was not
uate therapy, so continuous i.v. infusion was
keeping the heparin level at 0.5-1 mg/100
plasma. Fresh frozen plasma was given at
rate of 1 U of 300 ml every 6 hr. This
ined therapy seemed to reduce the severity of
leeding.

ALPHA-FETOPROTEIN AND HEPATITIS B ANTI-
GEN IN ACUTE HEPATITIS AND PRIMARY CAN-
F THE LIVER. *(E.)* Ruoslahti, E.; Seppala,
asanen, J. A.; Vuopio, P.; Helske, T.
. Serol. Bacteriol., Univ. Helsinki, Finland).
J. Gastroenterol. 8(3):197-202, 1973.

Circulating alpha-fetoprotein (AFP) levels were determined by a highly sensitive radioimmunoassay and increased levels were found in 3 of 19 patients with acute hepatitis. These 3 were HB Ag negative. Appearance of HB antibodies in the serum of 1 patient with a high AFP level could be demonstrated by radioimmunoassay only. Sequential serum samples revealed an increase of AFP within the normal range in 4 patients, of whom 2 were HB Ag positive and 2 negative. AFP levels in 100 healthy carriers of HB Ag were similar to those found in the normal Finnish population. Of 23 patients with a histologically verified primary liver cancer, 3 showed evidence of previous contact with the hepatitis B antigen. AFP was increased in 21 (91%) of the primary liver cancer cases. The normal combined frequency of HB Ag and HB antibody in the Finnish population is 0.4%. In these primary liver cancer patients the frequency was 8.7%. While hepatitis may play a role in the etiology of primary cancer of the liver even in Scandinavia, these results do not indicate a straightforward relation between the presence of HB Ag and increased serum levels of AFP.

5403 SIGNIFICANCE OF INTRAVASCULAR COAGULATION AND FIBRINOLYSIS IN ACUTE HEPATIC FAILURE. *(E.)* Hillenbrand, P.; Parbhoo, S. P.; Jedrychowski, A.; Sherlock, S. (Roy. Free Hosp., London, England). *Scand. J. Gastroenterol.* 8(S19):133-134, 1973.

Twenty-two patients in acute hepatic failure were studied to determine the incidence and magnitude of intravascular coagulation and fibrinolysis. More than half the patients were stuporous or comatose at the time. All except 2 had bleeding; however, only 1 had massive bleeding. Thrombotest levels were below 20% in all but 4; hemoglobin was decreased in half; platelet count was reduced; plasminogen activator activity and plasminogen were decreased; fibrin/fibrinogen degradation product level was increased moderately. In only 5 patients, 3 of whom had acute fatty liver of pregnancy and pre-eclampsia, was there fibrin in hepatic or portal vein radicles. More fibrin was present in areas of confluent necrosis. These data suggest a diagnosis of intravascular coagulation. However, neither intravascular coagulation nor secondary fibrinolysis was severe. Degree of bleeding related only to plasminogen and prognosis only to the thrombotest level. Histological findings and hematological indices did not appear related. Since heparin therapy carries some danger, it is not indicated in the routine management of acute hepatic failure due to the fact that intravascular coagulation is apparently not severe in the majority of acute hepatic failure patients.

5404 DIFFERENT TYPES OF AUSTRALIA ANTIGEN DETECTED BY RADIOIMMUNOASSAY AND IMMUNOELECTROSYNERESIS. *(E.)* Matsuda, S.; Sukeno, N.; Ishida, N. (Tohoku Univ. Sch. Med., Sendai, Japan). *Tohoku J. Exp. Med.* 108(1):95-96, 1972.

A mixed serum containing Australia (Au) antigen obtained from 3 healthy adults was fractionated by a discontinuous sucrose gradient centrifugation. When Au antigen in each fraction was assayed by radioimmunoassay (RIA) and immunoelectrosyneresis (LES), the peaks in titer of both assay systems appeared in different fraction. The RIA peak fraction contained spherical particles with dense core and tubular forms.

5405 SEROEPIDEMIOLOGICAL STUDIES OF TRANSFUSION-ASSOCIATED HEPATITIS. *(E.)* Tateda, A.; Kikuchi, K.; Shirachi, R.; Umenai, T.; Ishida, N. (Natl. Sendai Hosp., Japan). *Tohoku J. Exp. Med.* 108(1):99-100, 1972.

Australia (Au) antigen and antibody examinations were conducted on serial specimens of serum collected every week from a group of 79 patients who received blood transfusion before or after surgery. Out of 18 cases which received Au positive blood, 8 developed antigenemia and 7 produced antibody. Of 61 cases which received Au negative blood, 21 cases showed antibody response and the incidence of hepatitis in these 21 cases was only 1 (5%). Of the total 79 recipients, 8 cases developed hepatitis (10%), 6 of which were patients who received Au negative blood.

5406 CARBOHYDRATES IN HEPATITIS B ANTIGEN. *(E.)* Burrell, C. J.; Proudfoot, E.; Keen, G. A.; Marmion, B. P. (Univ. Edinburgh Med. Sch., England). *Nature [New Biol.]* 243(130):260-262, 1973.

5407 LONG INCUBATION HEPATITIS AND TATTOOING. *(E.)* Thomas, E.; Kearney, B. J.; Beare, J. H. (Northfield Wards, Roy. Adelaide Hosp., Australia). *Med. J. Aust.* 1(15):739-741, 1973.

5408 AUSTRALIA ANTIGEN AU(1) IN SCHOOL CHILDREN IN IBADAN, NIGERIA. *(E.)* Francis, T. I.; Smith, J. A. (Univ. Coll. Hosp., Ibadan, Nigeria). *J. Trop. Med. Hyg.* 76(1):19-22, 1973.

5409 THREE CASES OF SERUM HEPATITIS CONTRACTED AFTER SEXUAL INTERCOURSE. *(Dan.)* Poulsen, K. (Central Hosp., Esbjerg, Denmark). *Ugeskr. Laeg* 134(35):1854-1855, 1972.

5410 HISTAMINASE LEVEL CHANGES IN LIVER DAMAGE. *(E.)* Guha, T. K.; Chakravarti, H. S.; Basu, A.; Bannerjee, S.; Lahiri, S. C. (Sch. Tropical Med., Calcutta, India). *Res. Commun. Chem. Pathol. Pharmacol.* 5(3):843-850, 1973.

5411 VIRAL HEPATITIS. *(Fr.)* Reboul, M. (no affil.). *Gaz. Med. France* 79(20):3507-3514, 1972.

See also, 5124, 5133, 5147, 5151, 5171, 5431.

LIVER AND BILIARY TRACT

Chronic Hepatitis

5412 LEUKOPENIA IN ALCOHOLICS. *(E.)* Liu, Y. K. (VA Hosp., August, Ga.). *Am. J. Med.* 54(4):605-610, 1973.

In 6 chronic alcoholics (4 men and 2 women; aged 31-70 yr) without coexistent bacterial infection, splenomegaly or megaloblastic erythropoiesis, 9 leukopenic episodes were studied. The number of mature neutrophils was reduced in the blood and bone marrow, and the marrow granulocyte reserve was decreased. Serum unsaturated vitamin B_{12}-binding capacities were low, and muramidase activities were normal. Serum vitamin B_{12} was normal; serum folate was low in 5 and normal or high in 3. The reduced leukocyte count in blood and bone marrow, as well as the decreased granulocyte reserve and serum unsaturated vitamin B_{12}-binding capacity, returned to normal within 2 weeks without specific therapy. Slight to moderate hepatomegaly was present in 7 cases, but the size of the liver returned to normal in 1 to 2 weeks. It is unlikely that decreased folate concentration, in these patinets played a role in the pathogenesis of leukopenia. It is suggested that prolonged ingestion of large amounts of alcohol may induce leukopenia in man, primarily by suppressing the

lopoiesis in the bone marrow. The mechanism of
duced lymphocyte counts observed in some patients
nains unclear.

3 IMMUNOGLOBULIN DEPOSITION IN LIVER OF PATIENTS WITH ACTIVE CHRONIC HEPATITIS
ANTIBODY AGAINST SMOOTH MUSCLE. *(E.)* Dawkins,
L.; Joske, R. A. (Roy. Perth Hosp., Australia).
Med. J. 2(5867):643-645, 1973.

er biopsies from 33 patients with liver diseases
e studied by direct immunofluorescence. Clini-
and histological features of active chronic
atitis were found in 6 patients. All 6 were
tralia antigen negative and none had received
roid or immunosuppressive therapy for 6 months
or to biopsy. Of these 6 patients, 3 did not
anti-smooth-muscle antibody and liver tissue
these 3 showed no consistent pattern of staining
direct immunofluorescence. The remaining 3
l women, aged 16, 18 and 21 yr) all had IgG anti-
to smooth muscle in high titer and 1 had anti-
lear factor. Biopsies showed a distintive stain-
pattern, revealing coarse, linear fluorescence
ng many hepatic cords and patchy polygonal
rescence around some individual hepatocytes.
distinctive linear pattern was "blocked" by
reatment with unconjugated anti-IgG indicating
the deposited material contained IgG. The
ction of high titer of IgG anti-smooth-muscle
body itself is bound within the liver. It is
gested that there may be an antigen which cross-
ts with smooth muscle. It is suggested that ex-
ation of liver biopsies by direct immunofluores-
e may help in the investigation of liver disease
that humoral immunity may play a role in the
ogenesis of active chronic hepatitis.

4 INCIDENCE OF HEPATITIS ASSOCIATED ANTIGEN IN CHRONIC LIVER DISEASE IN SOUTHERN ITALY.
Vecchio-Blanco, C. del; Carrella, M.; M.
orti. (Inst. Clin. Med., Univ. Naples, Italy).
Hepato Gastroenterol. 20(2):138-142, 1973.

4 HEPATIC LESIONS IN CHRONIC HEPATITIS.
(Fr.) Lenne, Y.; Oudea, P. (no affil.).
Med. France 79(20):3483-8490, 1972.

5416 CHRONIC ACTIVE HEPATITIS ASSOCIATED WITH OXYPHENISATIN. *(E.)* Reynolds, J. D. H.; Wilber, R. D. (St. Luke's Hosp., Kansas City, Kans.). *Am. J. Gastroenterol.* 57(6):566-570, 1972.

5417 CHRONIC ACTIVE HEPATITIS IN CHILDREN. *(Fr.)* Odievre, M. (no. affil.). *Gaz. Med. France* 79(20):3477-3481, 1972.

5418 WHEN SHOULD YOU THINK OF ACTIVE HEPATITIS? *(Fr.)* Paolaggi, J. A.; Crespon, B. (no affil.). *Gaz. Med. France* 79(20):3455-3462, 1972.

5419 CLINICAL AND PROGRESSIVE ASPECTS OF CHRONIC HEPATITIS. *(E.)* Jost, B.; Chaput, J. C.; Etienne, J. P. (no affil.). *Gaz. Med. France* 79(20):3467-3474, 1972.

5420 IMMUNOPATHOLOGY OF CHRONIC ACTIVE HEPATITIS. *(Fr.)* Eyquem, A. (Pasteur Inst., Paris, France). *Gaz. Med. France* 79(20):3499-3505, 1972.

5421 BIOLOGY OF CHRONIC ACTIVE HEPATITIS. *(Fr.)* Cachin, M. (no affil.). *Gaz. Med. France* 79(20):3493-3496, 1972.

5422 STUDY ON THE INCIDENCE OF AUSTRALIA ANTIGEN IN PATIENTS WITH CHRONIC HEPATITIS. *(Pol.)* Tkaczewski, W.; Niedzielska, H.; Krawczynska, B.; Skatulska-Surmacka, T.; Tomczyk-Budzinska, H. (Acad. Med., Warsaw, Poland.) *Pol. Tyg. Lek.* 27(28):1075-1077, 1972.

See also, 5133, 5134, 5135, 5136.

LIVER AND BILIARY TRACT

Alcoholic Liver Disease

TREATMENT OF SEVERE LIVER FAILURE WITH HYPERALIMENTATION. *(E.)* Silvis, S. E.;
tscher, V. (Minneapolis VA Hosp., Minn.). *Am.*
stroenterol. 59(5):416-422, 1973.

Hyperalimentation was used in the treatment of 3 patients (2 men and 1 woman, aged 48-70 yr) with very severe alcoholic liver disease. At time of hospitalization, total bilirubin was 16.6-31.7 mg%, direct bilirubin 10.9-23.6 mg%, SGOT 190-242.8 U, and alkaline phosphatase 19-28.9 King-Armstrong U. All of the patients died during their hospitalization, but 2 who received hyperalimentation therapy for 7 and 9 days, resp., showed definite improvement in mental status during the treatment. In the third patient, treatment was not carried out long enough to evaluate its effects. All cases tolerated between 35-90 gm of protein hydrolysate. This suggests that parenteral protein hydrolysate administration might be better tolerated than oral protein in severe liver disease. The development of gastrointestinal bleeding in 2 patients may have resulted from increased portal pressure due to the therapy. The influence of amino acids on levels of certain toxic substances, such as ammonia, and the increased rapidity of hepatic regeneration when adequate calories and nitrogen are supplied are good reasons for hyperalimentation to be effective. A controlled trial of hyperalimentation appears indicated in less severe cases of liver failure.

5424 THE PROGNOSTIC SIGNIFICANCE OF MALLORY BODIES IN CIRRHOSIS WITH FATTY CHANGE. *(E.)* Christoffersen, P.; Juhl, E. (Communehosp., Copenhagen, Denmark). *Scand. J. Gastroenterol.* 8(3):225-228, 1973.

A comparison was made between 2 groups of cirrhosis patients: group 1, 39 patients, had Mallory bodies demonstrated in the primary liver biopsy; group 2, 65 patients, did not. Morphological findings showed that 30 (76%) of group 1 exhibited changes common to alcoholic hepatitis, i.e., necroses of liver cells containing Mallory bodies with infiltration of neutrophils. Group 1 had a greater incidence of focal liver-cell necroses and acidophilic bodies, a more pronounced inflammation, and a greater degree of destroyed lobular architecture than group 2 patients. There was no difference in the degree of fatty change and fibrosis or in bile duct proliferation, cholestasis, and iron. Biochemical and clinical tests revealed prothombin-proconvertin and serum cholinesterase were significantly lower in group 1. Serum aspartate-transaminase and bromsulfalein retention were elevated similarly in both groups. There was no sex or age distinction in the groups; the average age for both groups was 58 yr and 80% of the patients were men. Both groups carried similar numbers of chronic alcoholics. There was no difference in the cumulative survival rate or in the survival rate of chronic alcoholics from each group. Thus survival is independent of the presence of absence of Mallory bodies.

5425 PORTAL FIBROSIS IN ALCOHOLIC LIVER DISEASE. *(E.)* Sereny, G.; Devenyi, P. (Dept. Med., Addiction Res. Fdn., Toronto, Canada). *Am. J. Gastroenterol.* 57(5):429-434, 1972.

See also, 4947, 5060, 5066.

LIVER AND BILIARY TRACT

Cirrhosis

5426 HEPATOBILIARY DISEASES ASSOCIATED WITH SERUM ANTIMITOCHONDRIAL ANTIBODY (AMA). *(E.)* Kaplowitz, N.; Finlayson, N. D. C.; Walmsley, P.; Thurnherr, N.; Javitt, N. B. (New York Hosp.-Cornell Med. Ctr., N.Y.). *Am. J. Med.* 54(6): 725-730, 1973.

In an attempt to define the clinical spectrum of hepatobiliary disease associated with antimitochondrial antibody, 41 female and 4 male patients with antimitochondrial antibody were investigated. On the basis of clinical criteria, 22 female patients (38-77 yr old) had primary biliary cirrhosis (group I), 7 (1 male and 6 female, aged 29-79 yr) had extrahepatic biliary obstruction (group II), and 16 (3 male, and 13 female, aged 18-76 yr) had other liver diseases including chronic active hepatitis, cryptogenic cirrhosis and minor abnormalities of liver function (group III). Elevations of serum cholesterol, alkaline phosphatase, and bile acid levels separated the patients with primary biliary cirrhosis from those with miscellaneous liver disease, whereas in those with extrahepatic biliary obstruction results were intermediate. The cholestatic syndrome of primary biliary cirrhosis was further defined by a cholic to chenodoxycholic acid ratio >1.0 in 75% of the patients with primary biliary cirrhosis but in none of those with miscellaneous liver disease. No significant differences in antimitochondrial antibody titers or immunoglobulin M levels existed between the groups, indicating that these tests are not correlated with cholestatic liver disease. Examination of liver tissue revealed features compatible with the clinical impression in the majorit of cases. Cholelithiasis was present in 33% of the patients. Common bile duct obstruction due to stones and/or stricture was found in 6 and carcinoma in 1. Since 4 had fully developed cirrhosis at

e time of presentation, extrahepatic biliary ob-
ruction was probably a result of gallstone di-
ase complicating antimitochondrial antibody posi-
ve parenchymal liver disease. Antimitochondrial
tibody seems to be a marker for idiopathic paren-
ymal liver disease, primarily in middle-aged
men, but in itself gives no further diagnostic
formation and does not exclude extrahepatic bi-
ary obstruction.

27 ISOENZYMES OF SERUM LEUCINE AMINOPEPTIDASE (LAP)-PATTERN IN HEPATIC CIRRHOSIS.

) Phillips, R. W.; Manildi, E. R. (VA Hosp.,
kane, Wash.). *Lab. Med.* 4(4):28-30, 1973.

secutive cases (20) of adult males with alcoholic
rhosis of the liver were examined to evaluate
isoenzyme fractionation of leucine aminopepti-
e (LAP). Cellulose acetate electrophoresis
used for LAP separation. The isoenzyme tracing
each patient showed an abnormal pattern. The
tinctive feature of the cirrhotic LAP isoenzyme
tern was a marked peak increase in the Y frac-
n, with this Y peak usually exceeding the
ght of the X peak, the reverse of a normal trac-
. There were statistically significant differ-
es between the LAP isoenzyme fractions of nor-
controls and the group with cirrhosis of the
er. The clinical use of this procedure is
gested in diagnosing patients suspected of
atic cirrhosis. Changes in the size of the Y
ction may also be of value in following the
rse of such patients.

58 ROLE OF THE LIVER IN CONTROLLING THE IMMUNOGENICITY OF COMMENSAL BACTERIA IN THE

. *(E.)* Thomas, H. C.; McSween, R. N. M.; White,
. (Dept. Bacteriol., Univ. Glasgow, Scotland).
et (7815):1288-1291, 1973.

hosis was induced in rats by feeding with pheno-
ital and exposing them to carbon tetrachloride
nhalation. The capacity of the liver in normal
cirrhotic rats to trap both soluble and parti-
ite antigens was then compared. In both cirrho-
and normal rats the uptake of a dose of ^{125}I-
ne serum-albumin injected via the mesenteric
was 4%. After immunization with bovine serum-
min, the percentage uptake of ^{125}I-bovine serum
min was considerably increased in the normal
r, the increase varying directly with the amount
ntibody in the circulation. In cirrhotic ani-
the hepatic uptake was reduced to 80% of
al and the splenic uptake was increased from
% to 0.62%. The capacity of the liver in
hotic animals to retain antigen-antibody com-
es was considerably reduced; the amount of
lex found in the spleen and kidneys was in-
sed. The reduced ability of the liver to
immune complexes was directly related to the
rity of the cirrhosis. The normal liver
ped 35% of an injected dose of ^{125}I-*Salmonella*
ide; after immunization, 80% was retained by
liver. In cirrhotic animals the uptake of
lli was significantly reduced and a greater proportion were found in the spleen than in noncirrhotic animals. Again the amount of antigen trapped in the liver was related directly to the severity of the cirrhosis. These findings indicate that the hyperglobulinemia of liver disease is due to a reduction in the capacity of the liver to trap antigen so that additional antigen finds its way to antibody-producing lymphoid tissues as the spleen.

5429 HEPATIC COMA IN CIRRHOSIS OF THE LIVER. THE COURSE AND PROGNOSIS OF 100 CONSECUTIVE COMA EPISODES.

(E.) Prytz, H.; Sloth, K. (Bispebjerg Hosp., Copenhagen, Denmark). *Scand. J. Gastroenterol.* 8(3):229-233, 1973.

Consecutive episodes of hepatic coma in 61 patients (40 men and 21 women, average age 62 yr) with cirrhosis of the liver were examined during the period 1966-1970. Of the 61 patients, 26 were chronic alcoholics. Prednisone had been taken by 7 patients. Of 100 consecutive episodes, 57 were fatal. Hepatocellular function, however, was severely impaired even in cases surviving hepatic coma, thus indicating the late appearance of hepatic coma in the course of liver disease. The survival rate after the first coma episode was 55% at 1 month, 20% at 1 yr, and 10% at 4 yr. The only precipitating factor affecting prognosis was gastrointestinal bleeding. A fatal outcome was associated with a significantly higher frequency of ascites and edema and more abnormal values of alkaline phosphatases, asparatate transaminase, bilirubin, prothrombin and albumin, hyponatremia, and impaired renal function. Hypokalemia was found in 28% of the cases and correlated significantly with diuretic treatment. In addition to these parameters indicating impaired liver function, the prognosis worsened with increasing age and the presence of complicating diseases. Complicating medical and surgical conditions found in 58% of these cases included hepatoma (8), cancers of other locations (3), gastroduodenal ulcers (7), infectious complications (9), acute pancreatitis (3), and diabetes mellitus (3).

5430 ANDROGEN METABOLISM IN CIRRHOSIS OF THE LIVER.

(E.) Southren, A. L.; Gordon, G. G.; Olivo, J.; Rafii, F.; Rosenthal, W. S. (New York Med. Coll., N. Y.). *Metabolism* 22(5):695-702, 1973.

Androgen metabolism was studied in 13 male patients (aged 32-70 hr) with cirrhosis of the liver. The plasma level, metabolic clearance, and production rates of testosterone were decreased while the conversion ratio and rate transport constant of testosterone to androstenedione were increased. Administration of testosterone enanthate (200 mg/week for 2 weeks) increased the metabolic clearance rate of testosterone from 621 to 1069 liters/day, indicating that parenchymal hepatic dysfunction *per se* was not the cause for the reduced clearance rate. Morever, the patients had normal testicular reserve for the biosynthesis of testosterone as indicated by an almost 4-fold increase in the plasma concentration of testosterone (1.7-6.4 μg/liter) following the administration of human chorionic gonadotropin (5000 U/day for 3 days i.m.). These data demonstrate that the reduced production rate of testosterone in male cirrhotics is not due primarily to testicular disease but possibly reflects hypothalamic-pituitary suppression secondary to increased circulating estrogens. The observed increase in the rate of conversion of testosterone to androstenedione is consistent with this hypothesis. Thus, the hypogonadism of cirrhosis is due to a decreased production of testosterone rather than to an altered peripheral metabolism of the steroid.

5431 HEPARIN THERAPY IN THE CASE OF ACUTE LIVER CIRRHOSIS. *(E.)* Fischer, M.; Gauss, P.; Korp, W.; Nobis, H.; Schnack, H.; Weissman, A. (Municipal Hosp. Vienna-Lainz, Vienna, Austria). *Scand. J. Gastroenterol.* 8(S 19):135-138, 1973.

Twenty patients with acute liver cirrhosis and symptoms of a consumption coagulopathy were treated with heparin. Control patients, who received only vitamin K_1, showed improvement in the acute phase of liver cirrhosis, but no tendency for blood coagulation or fibrinolysis to normalize. Additional therapy with 50 mg heparin/day caused no change in the coagulation tests Normotest (NT) and fibrinogen, despite clinical improvement. The number of platelets increased slightly after the first week of therapy. After heparin was stopped, initial pathologic values returned after 21-28 days. During treatment with 75 mg heparin/day NT values did not change, fibrinogen increased slightly, and the number of platelets increased significantly. Initial pathological values of fibrinogen, platelet count, etc., returned 21-28 days after cessation of heparin. In 4 cases with increased reactive fibrinolytic activity a normalization appeared during heparin treatment. Hyperfibrinolysis was unchanged in patients without heparin. The use of heparin at the dose level of 75 mg/day is suggested when a temporary improvement in blood coagulation and hemostasis is required, e.g., for liver biopsy or urgent surgical intervention. In general, the characteristic hemostatic defect reappears within weeks after heparin therapy.

5432 DIABETES MELLITUS AND CIRRHOSIS. ELECTRON MICROSCOPE STUDY OF THE LIVER. *(It.)* Di Giacomo, V.; Carmenini, G.; Sciacca, A.; Neri, A.; Soccorsi, P. (Clin. Gen. Med. Ther., Univ. Rome, Italy). *Fegato* 18(1):57-76, 1972.

5433 CLINICAL AND MORPHOLOGICAL CORRELATION IN CIRRHOSIS. *(Rus.)* Lytkin, M. I.; Ageev, A. K.; Simonov, V. V.; Kalashnikov, S. A.; Trofimov, V. M. (S. M. Kirov Acad. Military Med., Leningrad, USSR). *Vestn. Khir.* (5):32-37, 1972.

5434 PROBLEMS OF LYMPHOVENOUS ANASTOMOSIS IN THE TREATMENT OF LIVER CIRRHOSIS AND ITS COMPLICATIONS. *(E.)* Wenzl, M.; Deimer, E.; Leodolter, I.; Wallnofer, H. (Sophie Hosp., Vienna, Austria). *Munch. Med. Wochenschr.* 115(17):776-781, 1973.

See also, 5131, 5134, 5135, 5169, 5378, 5424.

LIVER AND BILIARY TRACT

Gallbladder and Biliary Tract Diseases

5435 ACALCULOUS GALL-BLADDER DISEASE. *(E.)* Gunn, A.; Keddie, N. C.; Fox, H. (Manchester Roy. Infirm., England). *Br. J. Surg.* 60(3):213-215, 1973.

Of 130 consecutive unselected patients submitted to cholecystectomy for biliary disease, 19(14.6%) had acalculous gall-bladder disease. The clinical history of these patients (15 women and 4 men; aged 27-64 yr) did not differ significantly from those with calculous disease. Serum bilirubin was raised in 3 cases from 1.3-5 mg and in an additional 7 cases had serum alkaline phosphatase ranging from 16.5-20 K.A.U. The radiological and histopathological findings in this group were variable. There was a relatively high incidence of mucosal hyperplasia. Of these 19, 11 patients with a history of severe pain of previous acute cholecystitis were completely relieved of their symptoms by cholecystectomy. It is concluded that chronic gall-bladder disease may be acalculous and that, despite the lack of a homogeneous pathological background, surgery is of considerable value in a high proportion of such cases. Cholecystectomy can be recommended for patients with severe pain and a polyp visible on the cholecystogram.

36 BILE ACID SECRETION AND BILIARY BILE ACID COMPOSITION ALTERED BY CHOLECYSTECTOMY.

.) Malagelada, J. R.; Go, V. L. W.; Summerskill, H.; Gamble, W. S. (Mayo Clin., Rochester, Minn.). , *J. Dig. Dis.* 18(5):455-459, 1973.

anges in bile acid secretion and composition fol-wing cholecystectomy were studied in 47 subjects. the 47, 13 (12 females and 1 male, aged 47-69 yr) d undergone cholecystectomy for cholelithiasis least 1 yr earlier. An additional 24 female tients had gallstones and 10 healthy males served controls. After cholecystectomy, bile secretion continuous and 24-hr bile acid output of 648 oles/kg exceeds that in health. Cholecystokinin-ncreozymin influences neither bile acid secretion r the bile acid composition of bile after the eration. It is proposed that the absence of the llbladder causes more rapid enterohepatic recycling bile acids and therefore increased bile acid cretion. The bile acid composition of bile fol-ving cholecystectomy is abnormal for the same asons. A high proportion of secondary bile acids present (the ratio of primary to secondary bile ds decreased from 4.16 to 2.38 after cholecystec-ny), including several keto bile acids, and this attributed to increased exposure of the bile acid l to degradation by intestinal microorganisms.

5 7 CONGENITAL SEGMENTAL CYSTIC DILATATION OF THE BILIARY DUCT SYSTEM.

(E.) Glenn, F.; herry, C. K. (New York Hosp.-Cornell Med. Ctr., .). *Ann. Surg.* 177(6):705-713, 1973.

roup of 15 patients (12 females and 3 males, aged onths to 63 yr) with congenital segmented cystic atation of the biliary ductal system is reported. clinical manifestations so closely resemble se of calculous biliary tract disease that at sent the diagnosis is dependent almost entirely n cholangiographic findings. It is suggested t the congenital defect in the ductal system is marily one of hypoplasia or aplasia of the fibro-cular components of the submucosal and subserosal ers of the duct wall. This is compatible with frequent involvement of both the inta- and extra-atic bile ducts in these patients. In this series 15 patients, 10 had intrahepatic biliary tree olvement and all had segmental dilatation of a t or the entire extrahepatic bile ducts. Decom-ssion of the biliary tree has been accomplished most patients by cysto-jejunostomy with a long (30 cm) Roux-en-Y. Fewer patients have been ated by excision of the cystic dilatation or coduodenostomy. These patients require prolonged close observation postoperatively.

54 SURGICAL MANAGEMENT OF NEONATAL JAUNDICE.

(E.) DeLorimier, A. A. (Univ. California Med., San Francisco). *N. Engl. J. Med.* 24):1284-1286, 1973.

onged obstructive jaundice is difficult to nose in many infants. An abbreviated diagnostic procedure includes: history, a virus infection in the mother may have been transmitted to the fetus; physical exam, palpatation of an enlarged liver with a firm blunt edge; laboratory tests, bile pigment may show in the stool, a gastrointestinal series will show indentation in the second portion of the duodenum from a dilated bile duct, excretion into the stool of less than 10% of i.v. injected dose of rose bengal ^{131}I over a 3-day period, percutaneous needle biopsy of the liver (will give a correct diagnosis in 60%, an equivocal diagnosis in 16%, and an incorrect diagnosis in 24% of the cases); operative diagnosis, operative cholangiography and wedge biopsy of the liver gives the correct diagnosis in 98% of the cases. The timing of the operation is controversial. The occurrance of cirrhosis in 60% of infants with neonatal hepatitis after surgical exploration, as compared to the development of cirrhosis in only 20% of those who are not operated on, is viewed as a manifestation of the severity of their liver disease. Infants who require an operation to establish the diagnosis of cholestasis will have the most severe form of hepatitis. All successful hepatoportojejunostomies have been performed on infants less than 3 months old. For a multitude of reasons, hepatic transplantation should be left to the few centers that have an intense interest in the procedure.

5439 BILIARY DUCT HYPOPLASIA.

(E.) Krant, S. M.; Swenson, O. (Northwestern Univ. Med. Sch., Chicago, Ill.). *J. Pediatr. Surg.* 8(2): 301-307, 1973.

A review of 146 cases of obstructive and nonobstructive jaundice in infancy, observed over a 7 yr period, revealed 8 cases (5 males and 3 females) of hypoplasia of the bile ducts proven by operative cholangiogram (7 cases) and autopsy (1). Liver biopsy findings included cirrhosis (5), cholestasis (3), giant cell infiltration (2), decreased or compressed intrahepatic ducts (2), and intrahepatic atresia (found at autopsy, 1). The age of the patients at the time of the first liver biopsy ranged from 2 months to 2½ yr. It is suggested that, in obtaining the necessary cholangiogram, a Potts' clamp be placed across the distal bile duct and the study repeated if one injection of dye does not outline intrahepatic duct. Of 3 children followed for more than 5 yr, 2 died at ages 5½ and 6 yr with advanced biliary cirrhosis and a third, aged 8.2 yr, is in guarded condition having undergone at splenectomy at age 7 yr 4 months for massive splenomegaly and hypersplenism. These 3 cases of hypoplasia showed evidence of progressive hepatocellular damage with advanced cirrhosis and necrosis. Surgical manipulation and irrigation of the ductal systems during cholangiogram afforded temporary benefit in 2 cases. The minute lumina of the hypoplastic ducts may have been obstructed by thickened or inspissated bile and thus were cleared when irrigated at the time of operation. It is possible that an associated pathological process occurs simultaneously within the livers of patients with hypoplastic ducts; thus, the embryologic maldevelopment may not be extrahepatic alone but a combination of the two.

5440 SECRETORY ACTIVITY OF THE GASTRIC GLANDS AND DIGESTION OF PROTEIN IN THE STOMACH AFTER EXCLUSION OF THE EXTERNAL PANCREATIC SECRETION. *(E.)* Blagovidov, D. F.; Pomel'tsov, A. N.; V. N. Shatalov (Ministry Health, USSR). *Biull. Eksp. Biol. Med.* 74(11):19-21, 1972.

5441 CLASSIFICATION OF PATHOLOGICAL PATTERNS OF SMALL INTESTINE MUCOSA. *(Ger.)* Riecken, E. O.; Martini, G. A. (Med. Clin., Univ. Marburg/Lahn, Germany). *Dtsch. Med. Wochenschr.* 98(998-1004) 1973.

5442 ESTIMATING THE ECONOMIC COST OF ULCERATIVE COLITIS. *(E.)* Grogan, J. E.; Smith, M. C. (Sch. Pharm., Univ. Oklahoma, Norman). *Ostomy Q.* 10(3):62-63, 1973.

5443 CALCIFYING MUCINOUS ADENOCARCINOMA OF THE GALLBLADDER. *(E.)* Rogers, L. F.; Lastra, M. P.; Lin, K.-T.; Bennett, D. (Univ. Texas Med. Sch., Houston). *Am. J. Gastroenterol.* 59(5):441-445, 1973.

5444 TORSION OF THE GALL-BLADDER IN THE AGED. *(E.)* Bothra, R. (Hemlington Hosp., Middlesborough, Teesside, England). *Br. J. Surg.* 60(5):359-360, 1973.

5445 NEUROHISTOLOGICAL INTRAHEPATIC FEATURES OF BILIARY ATRESIA. *(It.)* Ottolenghi, A.; Chiamenti, C.; Fierro, A. (Inst. Spec. Surg. Pathol. Clin. Propedeutics, Univ. Padua, Italy). *Acta Chir. Ital.* 27(4):241-246, 1971.

5446 SURGICAL THERAPY OF "BENIGN" STENOSES OF THE EXTRAHEPATIC BILIARY TRACT. (CLINICAL AND STATISTICAL CONTRIBUTION). *(It.)* Angrisani, G.; Molino, D.; Accattatis, C. (Cadarelli Hosp., Naples, Italy). *Riforma Med.* 86(24):927-955, 1972.

5447 INVESTIGATION OF THYROXINE-BINDING PROTEINS AND TISSUE IODOPROTEINS OF THE LIVER. *(E.)* Turakulov, Ya. Kh.; Mirakhmedov, M. M.; Yangunaev, R. A. (Inst. Biochem., Tashkent, USSR). *Biull. Eksp. Biol. Med.* 74(12):41-43, 1972.

5448 ELECTRON-AUTORADIOGRAPHIC INVESTIGATION OF DNA SYNTHESIS IN HEPATOCYTES AFTER CARBON TETRACHLORIDE ADMINISTRATION. *(E.)* Pal'tsyn, A. A.; Vtyurin, B. V. (Acad. Med. Sci. USSR, Moscow). *Biull. Eksp. Biol. Med.* 74(12):99-101, 1972.

5449 HISTOENZYMOLOGICAL STUDY OF RAT LIVER IN EXPERIMENTAL CARBON TETRACHLORIDE INTOXICATION. *(Fr.)* Caulet, T.; Adnet, J. J.; Diebold, J. (Fac. Med., Reims, France). *Pathol. Eur.* 7(1):29-42, 1972.

5450 CHANGES IN THE REACTIVITY OF SMALL INTESTINAL RECEPTORS IN DOGS WITH ACUTE RADIATION SICKNESS. *(Rus.)* Pochechueva, G. S. (no affil.). *Biull. Eksp. Biol. Med.* 75(3):48-51, 1973.

5451 NON-OPERATIVE REMOVAL OF RESIDUAL COMMON DUCT STONES. *(E.)* Feldman, M. G.; Meltzer, S.; Lebowitz, W. B. (St. Vincent's Hosp., Bridgeport, Conn.). *Conn. Med.* 37(5):225-229, 1973.

5452 A CALCULOUS ACUTE TYPHOID CHOLECYSTITIS. *(E.)* Uthman, S. M. (Dept. Internal Med., American Univ. Beirut, Lebanon). *J. Med. Liban.* 25(6):503-505, 1972.

See also, 5122, 5128, 5163, 5165, 5173, 5225, 5306, 5377, 5473.

GENERAL

5453 CONGENITAL ALKALOSIS WITH DIARRHEA. A SEQUEL TO DARROW'S ORIGINAL DESCRIPTION. *(E.)* Gorden, P.; Levitin, H. (Diabetes Sect., Natl. Inst. Arthritis, N.I.H., Bethesda, Md.). *Ann. Intern. Med.* 78(6):876-882, 1973.

Congenital alkalosis or chloride-losing diarrhea is described in a 31 yr old man, the only known adult with this disease. The patient has had sustained watery diarrhea since birth. He has persistent proteinuria with urine protein excretion of

6 g/24 hr. At age 22 yr podagra and hyperuri-
mia were noted. Allopurinol therapy returned the
rum urate to normal levels. Hyperglycemia and
ycosuria which developed at age 28 yr were correc-
d by potassium repletion and weight reduction.
rrently he passes 500-1000 ml of watery stool/defec-
ion 3 times/day. Abnormal laboratory data included
ood urea nitrogen, 19-54 mg/100 ml; serum creati-
ne, 1.5-3.5 mg/100 ml; endogenous creatinine
earance, 22-100 ml/min; i.v. pyelogram, slight
crease in kidney size and poor concentration of
ntrast media; cholesterol, 290-314 mg/100 ml; and
iglycerides, 314-700 mg/100 ml. Glucose intoler-
ce was exhibited. Chloride concentration measure-
nts showed serum chloride is less than 90 mEq/l,
ine chloride less than 5 mEq/l, and stool chloride
out 140 mEq/l. The patient has a unique defect
the ileum which prevents luminal chloride absorp-
on from occurring unless it exceeds 120 mEq/l.
ectrolyte composition studies of the stool revealed
at sodium is the predominant stool cation and
loride the predominant anion; there is an absence
stool bicarbonate. Variations in NaCl intake
ange stool volume and cation composition, but do
alter stool chloride concentration or pH. The
tabolic alkalosis which occurs in response to
l restriction seems to be a function of increased
inary and stool hydrogen-ion excretion and contrac-
on of the extracellular fluid volume.

54 RETRACTILE MESENTERITIS.

(E.) Hazzi, C. G.; Lindner, A. E.; Marshak, R. H.
w York Univ. Sch. Med., N.Y.). *Am. J. Gastro-*
erol. 57(4):359-366, 1972.

ractile mesenteritis is primarily an affection
the mesentery of the small bowel, although the
ocolon and omentum are sometimes involved. The
entery becomes thick, nodular, and retracts with
ttered gray, firm plaques, irregular in out-
e. At these plaques, adhesions may occur. Dis-
tion and angulation of the adjacent small bowel
frequent. Lymphadenopathy and mesenteric venous
ombosis are sometimes found. Microscopic find-
s include fibrous tissue in bands and dense
lagen with occasional foci of fat necrosis and
phocytic infiltration. Signs of acute inflam-
ion are rare. When roentgenologic abnormalities
ur, they may be related either to the presence of
ass or to distortion of the intestine. The mass
displace and separate intestinal loops and other
cera. The affected small intestine may have
arre kinks and angulations, as well as multiple
as of segmental dilatation with normal intervening
estine. Peristalsis is often diminished. This
ition may be confused with mesenteric cysts and
nary or metastatic neoplasms of the mesentery or
estine. The theory is advanced that retractile
enteritis commences as degeneration and necrosis
mesenteric rat as a result of various nonspecific
nts such as trauma, infection, hypersensitivity
tions, and vasculitis. The subsequent inflamma-
y reaction then heals with connective tissue re-
ement. In some cases scarring leads to sclerosis
retraction of the mesentery. This complete se-
ice of events has never been observed.

5455 SHIGA BACILLUS DYSENTERY COMPLICATED BY BACTEREMIA AND DISSEMINATED INTRAVASCULAR COAGULATION.

(E.) Ullis, K. C.; Rosenblatt, R. M. (Univ. California Sch. Med., Los Angeles). *J. Pediatr.* 83(1):90-93, 1973.

A 5 yr old boy suffering from fever and vomiting followed 24 hr later by frequent diarrheal stools which subsequently contained gross blood and mucus was hospitalized in a semicomatose state. Serum sodium concentration was 111 mEq/liter; potassium 5.2 mEq/liter; and chloride 75 mEq/liter. *Shigella dysenteriae* was isolated from blood and stool cultures at the time of admission. After 48 hr of i.v. therapy and correction of hyponatremia with 3% saline solution, his sensorium cleared. Therapy included ampicillin (200 mg/kg/day, i.v., for 10 days) and kanamycin (15 mg/kg/day, i.m., for 5 days). On the 4th hospital day the child developed oliguria, microscopic hematuria, and pyuria associated with granular casts, elevated serum creatinine, and reduced creatinine clearance. On day 5, blood studies revealed fragmented RBC, thrombocytopenia, prolonged partial thromboplastin time, and elevation of split products from serum fibrin, suggesting the concomitant occurrence of disseminated intravascular coagulation. Although disseminated intravascular coagulation has not previously been documented in shigellosis, bleeding phenomena have been reported in several children with *Shigella* dysentery. On days 5 and 6, fluids were restricted and mannitol (1 g/kg, i.v., once a day) was given. He was discharged on day 20. This patient had *Shigella dysenteriae* type I dysentery and bacteremia. The occurrence of shigellosis complicated by bacteremia is rare.

5456 AN INTER-FAMILIAL OUTBREAK OF YERSINIA ENTEROCOLITICA ENTERITIS.

(E.) Gutman, L. T.; Ottesen, E. A.; Quan, T. J.; Noce, P. S.; Katz, S. L. (Duke Univ. Sch. Med., Durham, N.C.). *N. Engl. J. Med.* 288(26):1372-1377, 1973.

An outbreak of *Yersinia enterocolitica* enteritis involved 16 of 21 persons in 4 related and neighboring families. Of the 16, 7 were males, 9 females. The ages of 12 of the subjects ranged from 19 months to 13 yr; the remaining 4 were adults. The illness, which lead to 2 appendectomies and 2 deaths, was characterized by fever (87%), diarrhea (69%), severe abdominal pain (62%), vomiting (56%), pharyngitis (31%), headache (18%), and leukocytosis. Acute depression of serum albumin occurred in 4 children who experienced spontaneous recovery to normal levels after hospitalization. An elevated total lgM antibody level was demonstrated in 1 child. Serologic studies of 18 members of the families all showed a positive response by the passive hemagglutination test. Diagnostically important titers of 1:512 or greater, occurred in 8 persons and all had symptomatic illness. The source of infection was suggested to have been a bitch and its litter of sick puppies. The sequential onset of disease indicated that, once it had been introduced into the household, person-to-person transmission had occurred.

5457 GRAM-POSITIVE PERITONITIS IN CHILDREN. *(E.)* Harken, A. H.; Shochat, S. J. (Children's Hosp. Med. Ctr., Boston, Mass.). *Am. J. Surg.* 125(6):769-772, 1973.

5458 ANEURYSM OF THE GASTRODUODENAL ARTERY PRESENTING AS COMMON DUCT OBSTRUCTION WITH JAUNDICE. REVIEW OF THE LITERATURE. *(E.)* `Bassaly, I.; Schwartz, I. R.; Pinchuck, A.; Lerner, R. (Jewish Hosp., Med. Ctr., Brooklyn, N.Y.). *Am. J. Gastroenterol.* 59(5):435-440, 1973.

5459 INTRA-ABDOMINAL ABSCESS. *(E.)* Morello, D. C.; Matsumoto, T. (Hahnemann Med. Coll., Hosp., Philadelphia, Pa.). *Am. Surg.* 39(6):319-324, 1973.

5460 ABDOMINAL TRAUMA: A REPORT OF 129 CASES. *(E.)* Bates, T. (Luton, Dunstable Hosp., Bedfordshire, England). *Postgrad. Med. J.* 49(571): 285-292, 1973.

5461 GASTROINTESTINAL COMPLICATIONS OF LAPAROSCOPY STERILIZATION. *(E.)* Thompson, B. H.; Wheeless, Jr., C. R. (Johns Hopkins Hosp., Baltimore, Md.). *Obstet. Gynecol.* 41(5):669-676, 1973.

5462 GASTRO-INTESTINAL AND PERITONEAL TUBERCULOSIS. A STUDY OF CASES AT GROOTE SCHUUR HOSPITAL 1962-1971. *(E.)* Novis, B. H.; Bank, S.; Marks, I. N. (Groote Schuur Hosp., Cape Town, South Africa). *S. Afr. Med. J.* 47(9):365-372, 1973.

5463 INCISIONAL AND PERITONEAL INFECTION AFTER EMERGENCY CELIOTOMY. *(E.)* Stone, H. H.; Hester, Jr., T. R. (Emory Univ. Sch. Med., Atlanta, Ga.). *Ann. Surg.* 177(6):669-678, 1973.

5464 ALIMENTARY TRACT COLONIZATION BY CANDIDA ALBICANS. *(E.)* Stone, H. H.; Geheber, C. E.; Kolb, L. D.; Kitchens, W. R. (Emory Univ. Sch. Med., Atlanta, Ga.). *J. Surg. Res.* 14(4):273-276, 1973.

5465 FATAL STAPHYLOCOCCAL FOOD POISONING. *(E.)* Currier, II, R. W.; Taylor, Jr., A.; Wolf, F. S.; Warr, M. (Alabama State Dept. Health, Montgomery). *South. Med. J.* 66(6):703-705, 1973.

5466 SEPTICEMIA AND GASTROENTERITIS DUE TO VIBRIO FETUS. *(E.)* Park, C. H.; McDonald, F. K.; Twohig, A. M.; Cook, C. B. (Fairfax Hosp., Falls Church, Va.). *South. Med. J.* 66(5):531-533, 1973.

5467 CONSTIPATION: PATHOGENESIS AND MANAGEMENT. *(E.)* Tasman-Jones, C. (Auckland Hosp., Australia). *Drugs* 5(3):220-226, 1973.

5468 THE MANAGEMENT OF GASTROSCHISIS. *(E.)* Hollabaugh, R. S.; Boles, Jr., E. T. (Ohio State Univ. Coll. Med., Columbus). *J. Pediatr. Surg.* 8(2):263-270, 1973.

5469 GASTROINTESTINAL AND UNUSUAL CARDIOVASCULAR COMPLICATIONS IN A CASE OF EHLER-DANLOS SYNDROME. *(Fr.)* Gagnon, M.; Tulin, M. (Dept. Med., Univ. Montreal, Canada). *Union Med. Can.* 101(5):90[illegible]-909, 1972.

5470 ENTEROPATHOGENIC ESCHERICHIA COLI IN MAN AND FARM ANIMALS. *(E.)* Sojka, W. J. (Central Veterinary Lab., Weybridge, Surrey, England). *Can. Inst. Food Sci. Technol. J.* 6(2):52-63, 1973.

5471 AN UNUSUAL CAUSE OF "SURGICAL ACUTE ABDOMEN". *(E.)* Naqvi, M. A. (no affil.). *N.S. Med. Bull.* 51(6):178;184, 1972.

5472 SUBMANDIBULAR DUCT LITHIASIS ASSOCIATED WITH A MIXED SALIVARY GLAND TUMOUR. A CASE REPORT. *(E.)* Hinder, R. A.; Proctor, N. S. F. (Johannesburg Hosp., South Africa). *Br. J. Surg.* 60(3):246-247, 1973.

5473 OCCULT INJURIES OF THE LIVER, BILE DUCT, AND PANCREAS AFTER BLUNT ABDOMINAL TRAUMA. *(E.)* Longmire, Jr., W. P.; McArthur, M. S. (Univ. Southern California, Los Angeles, Sch. Med.). *Am. J. Surg.* 125(6):661-666, 1973.

5474 ENCEPHALOPATHY AND FATTY DEGENERATION OF VISCERA. REYE'S SYNDROME. *(E.)* Anonymous. (no affil.). *Arch. Dis. Child.* 48(6):411-413, 1973.

5475 CONTROLLED STUDIES OF METOPIMAZINE FOR THE TREATMENT OF NAUSEA AND VOMITING. *(E.)* Moertel, C. G.; Reitemeier, R. J. (Mayo Clin., Fdn., Rochester, Minn.). *J. Clin. Pharmacol.* 13(7):283-287, 1973.

5476 PATHOGENESIS OF SHIGELLA DIARRHEA. III. EFFECTS OF SHIGELLA ENTEROTOXIN IN CELL CULTURE. *(E.)* Keusch, G. T. (Mount Sinai Sch. Med. City Univ. New York, N.Y.). *Trans. N.Y. Acad. Sci.* 35(1):51-58, 1973.

5477 DIFFUSE PERITONEAL FIBROSIS IN THE NEWBORN DUE TO FETAL PERITONITIS. *(E.)* Remmele, W.; Loeper-Soeth, H. (no affil.). *Monatschr. Kinderheilk.* 121(3):91-97, 1973.

5478 MANAGEMENT OF DIARRHEA IN AN INFANT. *(Fr.* Meyer, B. (no affil.). *Rev. Med. Prat.* 13(23):1533-1537, 1972.

479 CELLULAR-VERSUS-HUMORAL AUTOIMMUNE RESPONSES TO SALIVARY GLAND IN SJOGREN'S YNDROME. *(E.)* Anderson, L. G.; Tarpley, T. M.; alal, N.; Cummings, N. A.; Wolf, R. O.; Schall, . L. (Natl. Inst. Dental Res., Bethesda, Md.). *lin. Exp. Immunol.* 13(3):335-342, 1973.

480 A CASE OF ABDOMINAL PAIN AND JAUNDICE IN SEVERE PRE-ECLAMPSIA. *(E.)* Hay, D. M. Division Obstetrics, Gynecology, Univ. Calgary, lberta, Canada). *J. Obstet. Gynecol.* 80:280-283, 973.

81 ISCHEMIC GASTROENTEROCOLITIS IN INFANTS: CLINICAL ASPECTS AND THOUGHTS ON ITS IOLOGY. *(E.)* Touloukian, R. J. (Yale Univ. Sch. d., New Haven, Conn.). *Conn. Med.* 37(5):229-234, 73.

82 NUCLEAR DNA IN SALIVARY GLAND TUMORS. II. ADENOCYSTIC CARCINOMAS. *(E.)* Kino, ; Richart, R. M.; Lattes, R. (Columbia Presbyrian Med. Ctr., New York, N.Y.). *Arch. Pathol.* (5):325-329, 1973.

83 DIFFERENTIAL INHIBITORY EFFECTS OF CHOLERA TOXOIDS AND GANGLIOSIDE ON THE ENTEROTOXINS VIBRIO CHOLERAE AND ESCHERICHIA COLI. *(E.)* erce, N. F. (Baltimore City Hosp., Md.). *J. Exp. d.* 137(4):1009-1023, 1973.

84 DUODENAL-COLIC FISTULA COMPLICATING A BILLROTH II PROCEDURE. *(E.)* Kerstein, M. (Boston VA Hosp., Mass.). *Int. Surg.* 58(6):424-5, 1973.

85 ACUTE ABDOMEN IN EXCESSIVE HYPERLIPIDEMIA. *(E.)* Sailer, D.; Schmidt, H. L.; Roesch, (Dept. Med., Path., Univ. Erlangen-Nuremberg, rmany). *Acta Hepato Gastroenterol.* 20(2):166-172, 73.

5486 DIFFUSE EOSINOPHILIC GASTRO-ENTERITIS WITH GRANULOMA FORMATION. *(E.)* Ranchod, M.; Birkenstock, W. E. (no affil.). *Suid Afr. Tydskr. Chir.* 11(1):33-35, 1973.

5487 EOSINOPHILIC INFILTRATION OF THE GASTROINTESTINAL TRACT. A REVIEW OF THE LITERATURE WITH THREE ADDITIONAL CASES. *(E.)* Birkenstock, W. E. (Groote Schuur Hosp., Cape Town, South Africa). *Suid Afr. Tydskr. Chir.* 11(1):9-14, 1973.

5488 AN IMPROVED METHOD FOR FAECAL COLLECTION: THE FAECAL FIELD-KIT. *(E.)* Hoffman, N. E.; LaRusso, N. F.; Hofmann, A. F. (Mayo Clin., Rochester, Minn.). *Lancet* (7817):1422-1423, 1973.

5489 TUMORS OF MINOR SALIVARY GLANDS. A STUDY OF 23 CASES. *(E.)* Sorial, A. (United Hosp. Med. Ctr., Newark, N.J.). *J. Med. Soc. N. J.* 70(6):447-451, 1973.

5490 ABDOMINAL INJURY ASSOCIATED WITH SEVERE BLUNT TRAUMA. *(E.)* Slatis, P.; Rokkanen, P.; Kataja, J.; Huittinen, V.-M. (Univ. Central Hosp., Helsinki, Finland). *Ann. Chir. Gynaecol. Fenn.* 62(1):9-17, 1973.

See also, 5015, 5157, 5180, 5207.

GENERAL

Parasitology

5 1 INTRAHEPATIC ABSCESSES: AMEBIC AND PYOGENIC. *(E.)* Ribaudo, J. M.; sner, A. (Ochsner Clin., New Orleans, La.). *J. Surg.* 125(5):570-574, 1973.

O 40 patients with intrahepatic abscesses, 21 (men and 1 woman, aged 17-68 yr) had amebic and 19 (14 men and 5 women, aged 30-60 yr) had pyogenic abscesses. In amebic abscess cases, 14 had abscesses in the right lobe of the liver, 2 in the left, and 2 in both lobes. Of the 21, 5 had multiple and 16 had solitary abscesses. In pyogenic abscess cases, 11 had abscesses in the right lobe, 5 in the left, and 3 in both. Of the 19, 6 had multiple and 13 had solitary abscesses. Of the 40 total cases, microorganisms were encountered in 19. The focus of origin of some of the pyogenic abscess cases was cholecystitis (3), colonic diverticulitis (1), septic anal ulcer (1), granulomatous colitis (1), metastatic lesions in the liver (2), and abdominal trauma with laceration of the liver (1). Clinical features do not differ markedly between the 2 groups, but fever was generally higher and of a septic type in those with pyogenic lesions. Leukocytosis, elevated erythrocyte sedimentation rates, anemia of less than 35%, and a hemoglobin of less than 10 g% were present in both groups. The most reliable liver function test was the bromosulfalein test. SGOT and alkaline phosphatase were frequently increased and serum albumin decreased in both groups. The most common radiologic finding was diaphragmatic elevation. Fluoroscopy did not prove useful. Hepatic scanning was the most valuable diagnostic procedure with positive results in all 21 cases so tested with no false-positive results. Open surgical drainage was performed on 15 amebic and 16 pyogenic abscess cases. Only 1 of each group had transpleural drainage; the others all had transabdominal drainage. Death occurred in only 2 patients, both with pyogenic abscesses, and resulted from overwhelming sepsis with subsequent development of multiple abscesses throughout the body.

5492 SCHISTOSOMA MANSONI INFECTION IN MICE DEPLETED OF THYMUS-DEPENDENT LYMPHOCYTES. I. EOSINOPHILIA AND IMMUNOLOGIC RESPONSES TO A SCHISTOSOMAL EGG PREPARATION. *(E.)* Fine, D. P.; Buchanan, R. D.; Colley, D. G. (Vanderbilt Univ. Sch. Med., Nashville, Tenn.). *Am. J. Pathol.* 71(2):193-206, 1973.

Experimental schistosomiasis was produced in male CBA/J mice depleted of thymus-dependent lymphocytes and thus unable to combat this infection. The normal anti-schistosomal egg antigen lymphocyte blastogenic response was abolished and dermal reactivity, reaginic antibody response and the major peak of peripheral blood eosinophilia were delayed. Antibodies mediating the early dermal reaction to schistosomal egg antigen and agglutinins for schistosomal egg antigen-coated particles were not inhibited by the thymus lymphocyte depletion. The normal granulomatous response did not develop, but rather focal hepatic and mucosal liquefactive necrosis, bacteremia, and accelerated mortality resulted.

5493 SCHISTOSOMA MANSONI INFECTION IN MICE DEPLETED OF THYMUS-DEPENDENT LYMPHOCYTES. II. PATHOLOGY AND ALTERED PATHOGENESIS. *(E.)* Buchanan, R. D.; Fine, D. P.; Colley, D. G. (Vanderbilt Univ. Sch. Med., Nashville, Tenn.). *Am. J. Pathol.* 71(2):207-218, 1973.

Male CBA/J mice were subjected to thymus-dependent lymphocyte depletion and subsequent infection with *Schistosoma mansoni*. The resulting depression of cellular immune response altered the course of severe chronic murine schistosomiasis in that it produced a more rapidly fatal systemic disease. Hepatic egg-induced granulomas are not seen, but rather the ova in the liver and intestinal mucosa are surrounded by zones of liquefactive necrosis containing cell debris and fragmented neutrophils. These lesions are associated with severe parenchymal cell destruction. Bacteria often contaminate the hepatic lesion allowing fatal toxemia or septicemia to develop. Many animals had tiny hemorrhagic ulcers in the ileum. It is suggested that the pathogenic mechanism responsible for the egg-induced liquefactive necrotic lesion may arise from the host's inability to mount a cell-mediated immune response which would normally circumscribe the eggs and protect against their enzymatic activities and phospholipids. Another explanation involves the formation of immune complexes in the absence of cell-mediated reactivity, and the subsequent interaction of the complexes with complement and polymorphonuclear leucocytes to produce tissue damage.

5494 SERUM GLYCOPROTEINS IN SCHISTOSOMAL HEPATIC FIBROSIS. *(E.)* Ghanem, M. H.; Guirgis, F. K.; El-Sway, M. (Dept. Med., Univ. Alexandria, U.A.R.). *J. Trop. Med. Hyg.* 76(1): 13-15, 1973.

Serum glycoproteins were studied in 24 patients (18 men and 6 women, aged 29 through 50 yr) with schistosomal hepatic fibrosis and 30 healthy matched controls. Factors known to affect the serum glycoproteins level apart from hepatic involvement were excluded. Significant increase of protein-bound hexose (22.4%), hexosamine (36.5%), fucose (85.7%), sialic acid (32.7), and seromucoids (as hexose, 26.7%; as tyrosine, 12.7%) were found in schistosomal hepatic fibrosis patients. These increases were attributed mainly to active fibrogenesis and tissue destruction and partly to secondary parathyroid overactivity and impaired glucose tolerance. Since an autoimmune mechanism has been suggested in schistosomal hepatic fibrosis, the elevated serum glycoproteins may be due to autoimmunity.

5495 FURTHER THERAPEUTIC STUDIES WITH LOW DOSAGE METRONIDAZOLE IN AMEBIASIS. *(E.)* Abd-Rabbo, H.; Abaza, H.; Hilal, G.; Asser, L. (Dept. Trop. Med., Univ. Alexandria, U.A.R.). *J. Trop. Med. Hyg.* 76(2):43-44, 1973.

Metronidazole (500 mg/day) was used in the successful treatment of 40 cases of amebiasis. The duration of treatment was 1 week in 4 males aged 13-48 yr with acute amebic dysentery; 10-14 days in 24 men and 5 women, aged 10-50 yr with chronic dysentery; 12 days in 2 men and 3 women, aged 30-50 yr with amebic hepatitis and 4 weeks in 2 adult males with liver abscess. Entameba cysts were cleared from all chronic dysenteric cases with the exception of one patient who relapsed in the follow-up period. Only 1 case of side effects was reported and consisted of nausea and vomiting. It is suggested that metronidazole be widely used, particularly in endemic areas since in low doses it appears able to control the source of infection, i.e. cyst passers.

6 ANTIBODY RESPONSE AND IMMUNOGLOBULIN
LEVELS IN HUMANS WITH ACUTE OR CHRONIC
PANOSOMA CRUZI INFECTIONS (CHAGAS' DISEASE).
) Wattuone, N. H.; Szarfman, A.; Gonzalez
pa, S. M. (Sch. Med., Univ. Buenos Aires, Ar-
tina). *J. Trop. Med. Hyg.* 76(2):45-47, 1973.

ect agglutination, indirect hemagglutination, in-
ect immunofluorescence, and complement fixation
ts for *Trypanosoma cruzi* antibodies were performed
sera from 11 patients with acute trypanosomiasis
30 days after onset of symptoms), 12 with chronic
panosomiasis, and 40 normal blood donors. Titers
1:64 or higher were detected by direct agglutina-
n in 10 of the 11 patients with acute infections,
sera had titers of 1:8 or higher by indirect im-
ofluorescence, but only 4 of the 11 had titers
her than 1:16 with indirect hemagglutination, and
4 were negative in the complement fixation test.
a from patients with chronic trypanosomiasis were
itive in all tests. Combination of the direct
lutination test with reductive cleavage of IgM by
ercaptoethanol confirmed that the early antibody
ponse in American trypanosomiasis is mainly IgM.
average total IgM concentration was significantly
her in patients with acute infections than in
se with chronic infections (P<0.01). Sera from
te and chronic cases had significantly higher IgG
centrations than sera from blood donors (P<0.01).
direct agglutination test combined with 2-mercap-
thanol treatment by the microtiter technique ap-
rs to be a simple method for diagnosing both acute
chronic trypanosomiasis. It may also be useful
field studies for the diagnosis of acute asympto-
ic cases.

7 FAILURE OF METRONIDAZOLE TO CURE HEPATIC
AMEBIC ABSCESS. *(E.)* Griffin, Jr., F. M.
. Naval Hosp., Great Lakes, Ill.). *N. Engl.*
ed. 288(26):1397, 1973.

8 ENTEROPARASITOSES IN FOODHANDLERS IN THE
PUBLIC HEALTH SECTOR OF EAST SANTIAGO.
.) Reyes, H.; Olea, M.; Hernandez, R. (Eastern
. Med., Univ. Chile, Santiago). *Bol. Chile*
asitol. 27(3-4):115-116, 1972.

9 FREQUENCY IN CHILE OF INTESTINAL PROTOZOAN
AND HEIMINTHIC HUMAN INFECTIONS DURING
1962-1972. *(Sp.)* Ramirez, R.; Schenone,
Galdames, M.; Romero, E.; Inzunza, E.; Rojas,
Palomino, H.; Szekely, R. (Dept. Microbiol.,
asitology, Univ. Chile, Santiago). *Bol. Chile*
asitol. 27(3-4):116-118, 1972.

0 TREATMENT OF CHRONIC INTESTINAL AMIEBIASIS
WITH TECLOZAN. *(Sp.)* Atias, A.; Sapunar,
Parodi, V.; Perez, C.; Gabor, M.; Stagno, S.;
iabre, V.; Galdames, M. (Dept. Microbiol.,
asitology, Univ. Chile, Santiago). *Bol. Chile*
asitol. 27(3-4):119-121, 1972.

5501 ENDOCRINE STUDIES ON SCHISTOSOMIASIS AND MALNUTRITION IN CHILDREN. *(E.)* Aboul-Dahab, Y. K. W.; Zaki, K.; Wishahi, A.; Wassef, S. A.; Abdel-Fattah, S.; Fahmi, L. H. (Ain-Shams Fac. Med., Cairo, Egypt). *Acta Hepato Gastroenterol.* 20(2): 102-115, 1973.

5502 CLINICAL TRIALS OF BENZOYL METRONIDAZOLE SUSPENSION IN AMOEBIC DYSENTERY AND AMOEBIC LIVER ABSCESS. *(E.)* Powell, S. J.; Rubidge, C. J.; Elsdon-Dew, R. (Dept. Med., Paediatrics, Child Health, Univ. Natal, Durban, South Africa). *S. Afr. Med. Tydskr.* 47(12):507-508, 1973.

5503 SURGICAL TREATMENT OF AMEBIC LIVER ABSCESS. *(E.)* Movsas, S. (Mount Sinai Sch. Med., City Univ. New York, N.Y.). *Am. J. Gastroenterol.* 59(5):427-434, 1973.

5504 AMEBIC ABSCESS OF THE LIVER. TREATMENT FAILURE WITH METRONIDAZOLE. *(E.)* Henn, R. M.; Collin, D. B. (U. S. Army Hosp. Specialized Treatment Ctr., Fort Gordon, Ga.). *J.A.M.A.* 224(10): 1394-1395, 1973.

5505 AMEBIC LIVER ABSCESS. *(Sp.)* Jarpa, A. (Chair of Parasitology, Chile Catholic Univ., Santiago). *Bol. Chile Parasitol.* 27(3-4):96-102, 1972.

5506 IMMUNOREACTIVE INSULIN IN SCHISTOSOMAL HEPATIC FIBROSIS. *(E.)* Ghanem, M. H.; Antoniades, H. N.; Habib, M.; Guirgis, F. K.; Zein, M. S.; Nofal, M.; El-Sawy, M. (Fac. Med., Alexandria Univ., Egypt). *J. Trop. Med. Hyg.* 76(1):16-18, 1973.

5507 HEPATIC ASCARIASIS. *(Por.)* Leao, A. S.; de Almeida, Jr., A. (Fac. Med., Federal Univ. Paraiba, Joao Pessoa, Brazil). *Rev. Assoc. Med. Brasil* 18(5):163-168, 1971.

5508 ELECTROMANOMETRIC STUDY OF THE RECTAL STUMP IN PATIENTS WITH AND WITHOUT SCHISTOSOMIASIS WHO HAD UNDERGONE THE DUHAMEL-HADDAD PROCEDURE. *(Por.)* Moreira, H.; de Rezende, J. M. (Fac. Med., Federal Univ. Goias, Goiania, Brazil). *Rev. Goiana Med.* 17(3/4):127-139, 1971.

5509 THE HEMORRHAGIC FORM OF HEPATIC BRUCELLOSIS. *(Sp.)* Bataller Sifre, R.; Lombart Bosch, A.; Peiro Olaso, V.; Illueca Ferrer, E. (Fac. Med., Valencia, Spain). *Rev. Esp. Enferm. Apar. Dig.* 37(2):219-228, 1972.

5510 PREVALENCE OF PARASITES IN PUERTO RICAN AND BLACK CHILDREN OF HARTFORD, CONNECTICUT. *(E.)* Pierz, J. J.; Lau, T.; Lepow, M. L. (Univ.

Connecticut Sch. Med., Hartford). *Conn. Med.* 37(6):291-294, 1973.

5511 EXPULSION OF NIPPOSTRONGYLUS BRASILIENSIS FROM THE INTESTINE OF RATS. COLLABORATION BETWEEN HUMORAL AND CELLULAR COMPONENTS OF THE IMMUNE RESPONSE. *(E.)* Dineen, J. K.; Ogilvie, B. M.; Kelly, J. D. (Division Animal Health, McMaster Lab., Glebe, Australia). *Immunology* 24(3):467-475, 1973.

5512 IMMUNOLOGIC STUDIES ON TRYPANOSOMA CRUZI, THE CAUSATIVE AGENT OF CHAGAS' DISEASE. *(E.)* Ostmann, H.; Oelerich, S.; Lederer, I. (no affil.). *Z. Tropenmed. Parasitol.* 24(1):72-80, 1973.

5513 INTESTINAL PARASITIC INFESTATION IN FARS PROVINCE, IRAN. *(E.)* Nazarian, I. (Dept. Path., Clin. Path., Pahlavi Univ., Shiraz, Iran). *Z. Tropenmed. Parasitol.* 24(1):45-50, 1973.

5514 SUSCEPTIBILITY OF BIOMPHALARIA ALEXANDRINA TO INFECTION WITH SCHISTOSOMA MANSONI IN EGYPT. *(E.)* Dawood, I. K.; Chu, K. Y. (Schistosomiasis Control Pilot Project, Training Ctr., El Saraya, Alexandria, Egypt). *J. Trop. Med. Hyg.* 76(2):48-50, 1973.

5515 AMEBIC LIVER ABSCESS IN LEBANON. A REPORT OF 37 CASES AND A REVIEW OF THE LITERATURE. *(E.)* Ballas, Z.; Uthman, S. M. (Sch. Med., American Univ. Beirut, Lebanon). *Am. J. Proctol.* 24(3):228-236, 1973.

5516 SYSTEMATIC THIABENDAZOLE ANTIHELMINTHIC CHEMOTHERAPY IN AFRICAN STUDENTS. *(Fr.)* Gateff, C.; Lemarinier, G.; Labusquiere, R. (Organ. Control Endemic Dis. Central Africa, Yaounde, Cameroon). *Ann. Soc. Belg. Med. Trop.* 52(2):103-112, 1972.

5517 THE IMMUNOLOGICAL SIGNIFICANCE OF HISTOLOGICAL CHANGES IN THE SPLEEN AND LIVER IN MOUSE MALARIA. *(E.)* Moran, C. J.; deRivera, V. S.; Turk, J. L. (Roy. Coll. Surg. England, London). *Clin. Exp. Immunol.* 13(3):467-478, 1973.

5518 EFFECT OF PREPATENT HELMINTH INFECTIONS ON PLASMA MINERAL AND ENZYME LEVELS AND THE MINERAL CONTENT OF SWINE LIVER. *(Ger.)* Enigk, K.; Feder, H.; Dey-Hazra, A. (Coll. Vet. Med., Hannover, Germany). *Z. Parasitenkd.* 39(4):323-338, 1972.

See also, 5125, 5153, 5164, 5170, 5329.

GENERAL

Regional Enteritis

5519 ILEOCECAL TUBERCULOSIS AND CROHN'S DISEASE. *(E.)* Shah, I. C. (Shree Sayaji Gen. Hosp., Baroda, India). *NY State J. Med.* 73(8):949-951, 1973.

Records of 20 cases (5 men and 15 women, aged 14-67 yr) of ileocecal tuberculosis occurring during a 3 yr period were examined. Symptoms ranging from 4 months to 4 yr in duration included abdominal pain in all cases, vomiting in 13, menstrual irregularities in 10, weight loss in 10, bowel disturbances in 5, tenderness in 13, visible or palpable mass in the right iliac fossa in 7, and anemia in 10. Narrowing and irregularity of the cecum with shortening of the ascending colon was revealed on barium X-ray. Treatment consisted of right hemicolectomy in 13 patients and bypass surgery only (ileotransverse colostomy) in 7. Histopathologic examination of the 13 right hemicolectomy specimens showed the cecum was involved in all with extreme narrowing of the lumen with thickening of the wall. The adjacent mesenteric lymph nodes were usually enlarged and the ileum was involved in 2 cases. Microscopic examination revealed caseation necrosis in the mesenteric lymph nodes. Acid-fast Mycobacterium tubercle bacilli were isolated in 7 patients. The distinction between Crohn's disease and abdominal tuberculosis is important for corticosteroids might prove dangerous in misdiagnosed Crohn's disease.

20 ISOLATED REGIONAL ENTERITIS OF THE DUODENUM. *(E.)* Silva, J. R.; Thomas,
M. (Robert Packer Hosp., Sayre, Pa.). *Am. J.
stroenterol.* 57(4):349-352, 1972.

44 yr old white male with epigastric distress and
sense of fullness after meals responded to anta-
d and antispasmodic therapy. After 9 yr he
turned with rectal bleeding and mild but per-
stent epigastric distress. Small tender anal
ssures and epigastric tenderness were treated
mptomatically. After 6 more yr he complained
episodes of vomiting after specific foods, more
equently associated with periods of tenseness.
weight loss of 9 kg had occurred in 4 yr. Alka-
ne phosphatase was 65 mU/ml (Bessey-Lowry).
per gastrointestinal X-ray revealed a concentric
enotic lesion of the proximal half of the second
rtion of the duodenum. Mucosal pattern was ir-
gular and prominent. Hypotonic duodenography
monstrated that this segment of the duodenum
uld not be distended fully and that the mucosal
ning was serrated and irregular in appearance.
opsy and frozen section examination of one of
e nodes removed at laparotomy showed lymphoid
perplasia with old granulomatous inflammation.
odenotomy was carried out, closed, and a retro-
lic gastrojejunostomy with bilateral vagotomy was
rformed. No enteritis or other disease was
esent in the remainder of the gastrointestinal
act. Pathology indicated the duodenal wall
cosa and submucosa were extensively infiltrated
th plasma cells, lymphocytes, and eosinophils
ong with focal ulceration of the mucosa. The
scularis propria and serosa contained large
gregates of lymphocytes and occasional tight non-
seating granulomas with multinucleated giant
lls. After 18 months of follow-up this patient
symptom-free. Regional enteritis restricted to
e duodenum is a rarity. This case is only the
xth to be reported. The long interval before di-
nosis (15 yr) is common. Gastrojejunostomy and
gotomy appear to be the surgical treatment of
oice when obstructive symptoms occur.

21 OSTEOMYELITIS OF THE ILIUM IN PATIENTS WITH CROHN'S DISEASE. *(E.)* Ghahremani,
G. (Med. Coll. Virginia, Richmond). *Am. J.
entgenol. Radium Ther. Nucl. Med.* 118(2):364-
0, 1973.

teomyelitis of the ilium complicating Crohn's dis-
se is reported in 4 male patients (aged 12-52 yr).
is represents an incidence of 2% of the 200 cases
amined in this study. In each instance fistulous
acts and abscesses were present adjacent to the
volved iliac wings, with 3 of the 4 cases involv-
g the right iliac wing. In 3 patients this type
pyogenic osteomyelitis responded well to antibio-
c therapy after the involved intestine and associ-
ed fistulas and abscesses were removed. The 4th
se was complicated by a much longer history of
gional enteritis, and the extent of osteomyelitis
th marginal sclerosis was also indicative of a
ronic process.

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See also, 5329, 5441.

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ABAZA, H.
5495*
ABD-RABBO, H.
5495*
ABDEL-FATTAH, S.
5501
ABE, K.
5076*
ABDUL-DAHAB, Y.K.M.
5501
ABRANTES, W.L.
5243
ACCATTATIS, C.
5446
ADLER, R.
5183
ADNET, J.J.
5449
AGEEV, A.K.
5433
AGHAJANIAN, G.
5286*
AGOSTI, A.
5003*
AHMAD, W.
5189
AHMED, M.
5313
AKER, Y.
5213
AL-AWQATI, Q.
4978*
ALBERTI, K.G.
5069*
ALEXANDER, C.H.
5155
ALFIERI, O.
5182
ALLEN, A.
5031
ALLEN, W.D.
5097*
ALLGOWER, M.
5219
ALLMENDINGER, P.D.
5350
ALMEIDA, J.D.
5394*
ALVARADO, J.
5270*
AMBERG, J.R.
4993
AMMON, R.
5087
ANACKER, H.
5161
ANDERSON, C.B.
5349
ANDERSON, L.G.
5479
ANDRIU, V.
5214
ANG, H.B.
5327*
ANGRISANI, G.
5446
ANTONIADES, H.N.
5506
ANTONIELLO, S.
5086
ANUKARAHANONTA, T.
5071*
AQUINO, C.J.
5050
ARANA, R.M.
5392*
ARGUTINSKAIA, S.V.
5039, 5041
ASO, R.
5308
ASSER, L.
5495*
ATHANASOULIS, C.
5290*
ATIAS, A.
5500
ATKINSON, G.O.
5338
ATTAGILE, G
5221
AUBREY, D.A.
5018*
BABINET, J.M.
5272*
BACH, G.G.
4984*, 4985*
BADERTSCHER, V.
5423*
BAIBEKOV, I.M.
4973
BAIBEKOVA, E.M.
4961
BAIN, E.
5057*
BAIROV, G.A.
5254
BAKER, R.R.
5344
BALLAS, Z.
5329, 5515
BALTZER, G.
5044*
BANATVALA, J.
5399*
BANK, S.
5462
BANNERJEE, S.
5410
BAR, A.
4988*
BARABAS, A.
5230
BARBONI, F.
4966, 4967, 4968
BARCO GRACIA, J.
5244
BARNES, G.L.
5152
BARON, J.H.
5227
BARONE, R.M.
5362
BARRERAS, R.F.
5032
BARROCAS, A.
5342
BARTLET, A.L.
5012
BASSALY, I.
5458
BASSANI, F.
5292
BASU, A.
5410
BATALLER SIFRE, R.
5509
BATES, T.
5460
BAUDET, B.
5234
BAUE, A.E.
4976*
BAUM, S.
5290*
BEACHLEY, M.C.
5341
BEARE, J.H.
5407
BEAUDOIN, J.G.
5083*
BEGEMANN, F.
5277
BELJAN, J.R.
5196
BELL, W.J.
5251
BELL, C.F.
5115
BELL, T.K.
4987*
BELOSHAPKO, A.A.
5206
BENEDETTI, A.
5078*
BENJAMIN, H.B.
5037
BENNETT, A.
5112
BENNETT, D.
5443
BERARD, A.
5180*
BERGMAN, F.
4946*
BERGSTROM, K.
5354*
BERKOS, O.V.
5034
BERMAN, I.R.
5320
BERNIER, J.
4982*
BERNSTEIN, J.
5060*
BERQUIST, T.H.
5126*
BERSIMEAEV, R.I.
5039, 5041
BERSTAD, A.
5195*
BERTACCINI, G.
5003*, 5038
BEVAN, P.G.
5288*

NUMBERS FOLLOWED BY AN ASTERISK INDICATE ABSTRACTS. OTHER NUMBERS REFER TO CITATIONS.

ATHAL, P.S.
5274*
BER, B.
5004*
CKHAM, C.E., JR.
5225
RKENSTOCK, W.E.
5486, 5487
ACKBURN, G.
5080*
ACKLOW, N.R.
5238*
AGOVIDOV, D.F.
5440
ENN, B.
5526
OMHOFF, J.P.
5130*, 5134*
OMQUIST, L.
4951
DE, C.
5044*
LES, E.T., JR.
5468
ON, C.J.
5137
RISKIN, A.I.
4965
SENBERG, H.
5376
TEZATU, I.F.
5171
THA, J.B.C.
5322
THRA, R.
5444
TTCHER, I.
5207
UHOUTSOS, J.
5230
ACONIER, J.H.
5133*
ADY, P.G.
5204
ALOW, S.P.
5023*, 5192*
ANDT, E.N.
5027*
EINING, H.
4958
OCKERHOFF, H.
5043*
OCKMEIER, M.J.
5267
ODERS, C.W.
5232
ONSHTEIN, E.L.
5173
OOKE, B.N.
5328
OTMAN, B.
5396*, 5397*
OWN, G.C.
5100*
OWN, I.L.
5273*
UNGARD, D.A.
5337
BUCHANAN, R.D.
5492*, 5493*
BUCHWALD, H.
5261
BUCK, R.C.
5120
BUDOWSKI, P.
4988*
BUNTE, H.
5181*
BURDETTE, W.J.
5318
BURDINE, J.A.
5150
BURGER, L.
5181*
BURHOL, P.G.
5195*
BURKE, J.
5251
BURNS, G.P.
5018*
BURRELL, C.J.
5406
BURTON, R.C.
5304
BURY, K.D.
5000
BUSSELBERG, E.
4974
BUTLER, W.H.
5061*
BUTTI, A.
5240*
BUXTON, B.H.
5081*
BYERS, S.O.
5077*
CABANNE BENGOLEA, E.
5295
CACCIATORE, L.
5086
CACHIN, M.
5421
CALATRONI, A.
4970
CAMERON, J.L.
4978*
CAMPITELLI, A.J.
5205
CAMUS, J.
5047*
CAPRARO, V.
4992
CARLSON, H.C.
5126*
CARMENINI, G.
5432
CARR, J.B.
5391*
CARRELL, R.W.
5115
CARRELLA, M.
5414
CARSWELL, F.
5273*
CARTER, D.C.
5028*
CARTIN MONTERO, E.
5359
CASE, R.M.
5048
CASTAGNA, J.T.
5324
CASTEDO, C.
5347
CASTELFRANCHI, P.L.
5050
CASTELL, D.O.
5209
CASTELLANI, A.A.
4970
CASTILLO, R.G.
5269*
CASTO, B.
5398*
CAULET, T.
5449
CAVAGGIONI, A.L.
5038
CAWOOD, D.H.
5322
CELLESI, C.
4969
CETTA, G.
4970
CHAKRAVARTI, H.S.
5410
CHAKRAVARTI, R.N.
5066*
CHANDLER, A.M.
4949*
CHANEY, A.W. JR.
5142
CHANTURISHVILLI, T.P.
4975
CHAPPELL, J.S.
5302
CHAPUT, J.C.
5419
CHARFATTE, N.
5058*
CHARVAT, A.
5296
CHAUDHURI, T.K.
5143
CHERNICHUK, L.L.
5171
CHEY, W.Y.
4947*, 5016*
CHHUTTANI, P.N.
5066*
CHIAMENTI, C.
5445
CHIPAIL, A.
5262
CHOU, S.T.
4971
CHOUDHURY, A.
5118
CHRISTENSEN, J.
5001*
CHRISTIE, J.H.
5143
CHRISTOFFERSEN, P.
5424*

CHRISTOPHE, J.
5047*
CHU, K.Y.
5514
CHUBAROVA, N.I.
5010
CHVAPIL, M.
5054*
CIACERI, G.
5221
CINTI, C.
5352
CLAMP, J.R.
5332
CLARK, R.
5401*
CLASSEN, M.
5036, 5525
CLEMENTS, J.L., JR.
5338
CLENDINNEN, B.G.
5027*
COATES, G.
5123*
COCHRAN, M
5279
COHEN, L.E.
5224
COHEN, S.
5005*
COLLEY, D.G.
5492*, 5493*
COLLIN, D.E.
5504
COLOMBETTI, L.G.
5149
COLTORTI, M.
5414
COMPORTI, M.
5078*
CONCANNON, J.P.
5104
CONRAD, M.E.
5398*
COOK, C.B.
5466
COOK, M.G.
5279
COOPER, J.H.
5262
COOPER, S.D.
5059*
CORMAN, J.
5220
CORNELL, H.J.
5274*
CORRADINO, R.A.
4990
CORTESE, A.F.
5258
COSIO, F.G.
5346
COSTELLO, L.C.
5055*
COTTRALL, M.F.
5145
COUPLAND, G.A.E.
5194*
COUREY, W.R.
5290*
COWLEY, D.J.
5227
CRADDOCK, T.D.
5123*
CRESPON, B.
5418
CRONSTEDT, J.L.
5127*
CULVER, G.J.
5183
CUMBERLAND, V.H.
5194*
CUMMINGS, N.A.
5479
CURRIER, R.W. II
5465
CURTO CASDUS, J.A.
5293
CUTHBERTSON, A.M.
5311
DALLE VACCHE, G.
5352
DANESE, C.A.
5108*
DANIEL, A.
5083*
DANIELS, H.A.
5226
DAS, G.
5121*
DATTA, D.V.
5066*
DAVIDSON, C.S.
5379
DAVIES, G.T.
5158
DAVIES, R.E.
5110*
DAVIS, C.P.
5252
DAVIS, N.E.
5142
DAVYDOVSKII, A.A.
5382*
DAWKINS, R.L.
5413*
DAWOOD, A.K.
5514
DE ALMEIDA, A., JR.
5507
DE LORIMIER, A.A.
5438*
DE PAILLERETS, F.
5272*
DE QUESADA, A.M.
5391*
DE REZENDE, J.M.
5508
DE RITIS, F.
5086
DE RIVERA, V.S.
5517
DEAN, R.H.
5340
DECHELETTE, M.A.
5180*
DEIMER, E.
5434
DEINHARDT, F.
5398*
DELIDES, G.
5289*
DELIGDISCH, L.
5260
DEMLING, L.
5036
DEPALMA, R.G.
4999
DEPPE, W.M.
5375
DESCHODT-LANCKMAN, M.
5047*
DEVENYI, P.
5425
DEY-HAZRA, A.
5518
DI GIACOMO, V.
5432
DIAZ, N.
5270*
DIEBOLD, J.
5449
DINEEN, J.K.
5511
DINNER, M.
5302
DITTRICH, A.
5058*
DIWOK, K.
5172, 5363
DOERING, E.J. III
5202
DOTTER, C.T.
5290*
DOZOIS, R.R.
5028*
DRAGAN, S.
5282
DRAGSTEDT, L.R.
5231
DREILING, D.A.
5108*
DROBINSKII, I.R.
5171
DRUT, R.
5347
DRYNIAYEV, V.A.
5092
DUNN, M.
5201
DUNN, P.K.
5155
EASLEY, G.W.
5300
EDDLESTON, A.
5376
EDWARDS, J.P.
5144
EGOROVA, A.T.
5382*
EINARSSON, K.
5275
EL-SAWY, M.
5506

NUMBERS FOLLOWED BY AN ASTERISK INDICATE ABSTRACTS. OTHER NUMBERS REFER TO CITATIONS.

-SWAY, M.
5494*
GIO, K.
5130*
LIOTT, D.W.
5203
SDON-DEW, R.
5502
ENAI, T.
5405*
EROTH, C.-M.
5157
IGK, K.
5518
EMEEVA, A.F.
5034
IKSSON, O.
5133*
SPAMER, V.
5029*
HUTKIN, G.D.
5351
POSITO, G.
4992
IENNE, J.P.
5419
O, T.
5102
ANS, D.C.
5025*
ANS, J.A.
5165
ANS, K.T.
5158
QUEM, A.
5420
ELLI, A.
4992
HMI, L.H.
5501
NGHANEL, J
4955
RA, J.
5004*
RBER, J.L.
5071*
DER, H.
5518
IGELSON, J.
5343
INMAN, L.
5073*
LCMAN, M.G.
5451
RGUSON, A.
5273*
RNANDES, J.
5364*
RRALI, M.
5078*
RRERI, A.M.
5091
TICU, M.
5124*
UER, G.
5059*
ERRO, A.
5449

FIERST, S.M.
5210
FINE, D.P.
5492*, 5493*
FINK, G.
5098*
FINLAYSON, N.D.C.
5426*
FISCHER, M.
5431*
FISHER, R.S.
5005*
FLORIN-CHRISTENSEN, A.
5392*
FLUTE, P.T.
5401*
FONT PASCUAL, J.A.
5293
FONTAINE, J.-L.
5343
FONTENELLE, L.J.
5342
FORDHAM, E.W.
5253
FORREST, A.P.M.
5021*
FORSTER, H.
4981*
FORSTNER, G.
4948*
FORSTNER, J.
4948*
FOSTER, J.H.
5350
FOX, H.
5435*
FOX, M.
5305
FRANCILLON, P.
5234
FRANCIS, T.I.
5389*, 5408
FRASER, D.
5332
FREEMAN, B.W.
5001*
FREUND, E.
5316
FRIEDMAN, M.
5077*
FRIESSEN, R.H.
5527
FROESNER, G.
5398*
FUCHS, H.-F.
5525
FUJII, T.
5388
FUNG, W.P.
5327*
FURUTA, Y.
5045*
GABOR, M.
5500
GAGNON, M.
5469
GALDAMES, M.
5499, 5500

GALERIU, G.
5214
GALL, E.A.
5385*
GALLAGHER, J.C.
5279
GALLET, J.P.
5272*
GAMBLE, W.S.
5436*
GANOTE, C.E.
5074*
GARCIA JULIAN, G.
5244
GARCIA, R.
5202
GARDNER, R.J.
5198
GARIBOTTI, A.C.
5205
GAROFCLI, C.
5166
GATEFF, C.
5516
GATIN, G.
5371
GAUSS, P.
5431*
GAVA, L.
5352
GAVRILA, I.
5124*
GEELHOED, G.W.
5212
GEHEBER, C.E.
5464
GELARDEN, R.T.
4994
GENEIX, A.
4953
GENET, E.F.
5188
GENNARI, R.
5240*
GEORGALAS-PENESIS, M.
5108*
GERMER, W.D.
5264
GERVASO, M.V.
4952
GERZELI, G.
4952
GHAHREMANI, G.G.
5521*
GHANEM, M.H.
5494*, 5506
GIACOBAZZI, P.
5125*
GIACOMCNI, M.A.
5248
GIBSON, J.B.
4971
GILDAY, D.L.
5123*
GIOANNINI, P.
5394*
GJONE, E.
5130*, 5134*

GLASS, G.E.J.
5015*
GLENN, F.
5437*
GO, V.L.W.
5436*
GOBBEL, W.
5340
GODFREY, H.R.
5396*
GOEBELL, H.
5044*
GOLD, A.J.
5055*
GOLDBERG, D.M.
5052
GOLDBERG, H.I.
4993, 5333
GOLDIE, J.H.
5271*
GOLDSTEIN, F.
5523
GOLDSTEIN, H.M.
5224
GOLDSTEIN, M.J.
5197
GOLIGHER, J.C.
5144
GOLOVANOV, M.V.
4965
GONZALEZ CAPPA, S.M.
5496*
GOODRIDGE, A.G.
5072*
GORDEN, P.
5453*
GORDON, G.G.
5430*
GORESKY, C.A.
4984*, 4985*
GOSSNER, W.
4959
GOURGOUTIS, G.C.
5121*
GRANDJEAN, J.P.
5234
GRAVELEAU, D.
5371
GRAVELEUA, D.
5343
GRAYSTON, P.
5000
GREENFIELD, S.
5079*
GREENOUGH, W.B., III
4978*
GREENSTEIN, A.J.
5284*
GRENET, P.
5272*
GRIEVE, S.
5373
GRIFFIN, F.M., JR.
5497
GRIFFIN, T.F.R.
5122*
GRILLI, S.
5091
GRIME, R.T.
5236, 5266
GRISWOLD, F.C.
5198
GROGAN, J.E.
5442
GROSFELD, J.L.
5320
GROVER, N.K.
5298
GROVES, L.K.
5184
GRUENSTEIN, M.
5023*, 5192*
GUDMAND-HOYER, E.
5291*
GUENTER, W.
5103
GUHA, T.K.
5410
GUILLAT, J.-C.
5371
GUIRGIS, F.K.
5494*, 5506
GULATI, S.M.
5298
GULIAKIN, M.F.
5268
GULZOW, M.
5172, 5363
GUNN, A.
5435*
GUPTA, T.K.D.
5362
GUTMAN, L.T.
5456*
GUTMAN, R.A.
5098*
HAACK, V.
5099*
HABERMAN, H.F.
5057*
HABIB, M.
5506
HACKMAN, R.
4998
HAGEMANN, R.F.
5104
HAGEN, G.
5263
HAGEN, R.O.
5224
HAISLIP, C.E.
5198
HAKOMORI, S.-I.
5348
HALL, R.C.
5337
HALL, W.H.
5280
HALPERIN, P.
5345
HAMILTON, R.
5114
HANSEN, H.H.
5179*
HANSKY, J.
5194*
HARA, M.
5308
HARDIN, C.A.
5527
HARDY, K.J.
5311
HARKEN, A.H.
5457
HARRISON, C.V.
5394*
HARRISON, D.
5269*
HARRISON, R.B.
5265
HARTER, J.S.
5189
HARTIALA, K.
5107
HARVEY, R.F.
5006*
HASHIMOTO, K.
5045*
HASSAN, M.A.
5022*
HAU, T.
5037
HAVA, M.
5011
HAY, D.M.
5480
HAYAKAWA, T.
5051
HAYS, M.T.
4997
HAZZI, C.G.
5454*
HEATON, K.W.
5006*
HEGARTY, M.M.
5236
HEINKEL, K.
5176
HELBIG, H.D.
5162
HELL, K.
5219
HELLRIEGEL, W.
5321
HELLSTROM, K.
5275, 5354*
HELPAF, B.
4958
HELSKE, T.
5402*
HENDRICKS, J.
5016*
HENDRICKX, J.
5050
HENN, R.M.
5504
HERBST, J.J.
5096*
HERMAN, D.L.
4995
HERMANEK, P.
5526
HERMODSSON, S.
5395*

NUMBERS FOLLOWED BY AN ASTERISK INDICATE ABSTRACTS. OTHER NUMBERS REFER TO CITATIONS.

RNANDEZ, R.
5498
STER, T.F., JR.
5463
LAL, G.
5495*
LLENBRAND, P.
5135*, 5403*
NCHEY, E.J.
5026*
NDER, R.A.
5472
RATSUKA, J.
5309
TANANT, S.
5023*
BSLEY, M.
5022*
ENIG, V.
5062*
FFMAN, N.E.
4977*, 5488
FMAN, A.F.
4977*
FMANN, A.F.
4986*, 5488
LDEN, M.P.
5187
LLABAUGH, R.S.
5468
LMES, A.W.
5398*
LMES, J.T.
5247
LMGREN, J.
5395*
LMQUIST, D.L.
5150
LST, H.I.
5114
LTON, J.C.
5168
NJO, I.
5335*, 5377
OGBERGEN, J.A.M.
5325
FTON, D.S.
4964
RNE, C.H.W.
5273*
RNIG, D.
4979*
RTON, B.J.
5067*
BER, M.
5149
GHES, E.S.R.
5311
HNLEIN, H.K.
5181*
ITTINEN, V.-M.
5490
LSMANN, W.C.
5364*
RWITZ, A.
5011
RWITZ, S.
4988*
HUTSON, D.G.
5339
IASHINA, I.N.
5064*
IKRAM, H.
5397*
ILLUECA FERRER, E.
5509
IMPICCIATORE, M.
5003*
INZUNZA, E.
5499
IONESCU, M.I.
5187
IRFAN, H.
5313
IRVIN, T.T.
5144
ISHIDA, N.
5404*, 5405*
ISHII, H.
5073*
ISRAEL, T.
5060*
ISSELBACHER, K.J.
5101
ITO, Y.
5076*
IUDIN, I.IU.
5268
IUTIN, A.I.
5173
IWARSON, S.
5395*
IWATSUKI, K.
5045*
JACOBS, W.H.
5345
JAMES, A.E., JR.
5154
JARPA, A.
5505
JASS, D.
5397*
JAVITT, N.B.
5426*
JEAN, R.
5276
JEDRYCHOWSKI, A.
5403*
JERVIS, H.R.
5217*
JIN, M.
5297
JINNAI, D.
5308
JOHANSEN, S.
4954
JOHANSON, K.J.
5106
JOHANSSON, H.
5007*, 5009
JOHL, J.G.
5073*
JOHN, H.T.
5186
JOHNSON, L.R.
4949*
JOHNSON, R.B.
5190
JOHNSON, R.M.
5362
JOHNSON, T.F.
5055*
JOHNSON, W.
5023*
JONES, M.B.S.
4991
JORDAN, G.L., JR.
5211
JOSEPH, W.L.
5212
JOSKE, R.A.
5413*
JOST, B.
5419
JUHL, E.
5424*
KAGAWA, H.
5147
KAHN, S.S.
5285*
KALASHNIKOV, S.A.
5433
KALKHOFF, R.K.
5090
KALLNER, M.
5354*
KALNINS, V.
4948*
KAMIETH, H.
5167
KAPLAN, S.
5037
KAPLOWITZ, N.
5426*
KARASAKI, S
4972
KARK, A.E.
5108*, 5284*
KASHULINA, A.P.
4965
KATAJA, J.
5490
KATZ, A.
5271*
KATZ, M.
4988*
KATZ, S.L.
5456*
KAUDE, J.
5139
KAUSHIK, S.P.
5314
KAUTZSCH, E.
5367*
KAVENO, H.
5035
KEARNEY, B.J.
5407
KEDDIE, N.C.
5435*
KEEN, G.A.
5406
KEITH, T.A.
5385*

KELLY, J.D.
5511
KEMP, G.E.
5389*
KENDALL, F.M.
5299
KENNEDY, P.A.
5353*
KEOHANE, S.J.
5110*
KERSTEIN, M.D.
5484
KEUSCH, G.T.
5476
KHO, K.M.
5327*
KHODADOOST, J.
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KIELY, J.M.
5365*
KIKKAWA, N.
5308
KIKUCHI, K.
5405*
KIM, C.Y.
5393*
KING, C.A.
5111*
KINO, I.
5482
KIRBY, J.R.
5256
KIRCHGESSNER, M.
4983*
KIRDANI, R.Y.
5053
KIRIMOTO, K.
5147
KIRK, D.
5201
KIRK, F.M.
5259
KIRKPATRICK, J.R.
5028*, 5158
KITAMURA, O.
5377
KITCHENS, W.R.
5464
KIVELITZ, H.
5215
KLEINSCHMIDT, F.
5215
KLEINTEICH, B.
5246
KLIPSTEIN, F.A.
5269*
KNILL-JONES, R.P.
5169
KOBAYASHI, Y.
5035
KOBLER, H.
5245
KOCH, H.
5036
KOCHOYAN, P.
5276
KOLB, L.D.
5464
KOLDOVSKY, O.
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KOLLER, F.
5132*
KOLMAKOV, V.N.
5075*
KONISHI, Y.
5071*
KONONUCHENKO, V.P.
5370*
KONTUREK, S.J.
5013*
KORMAN, M.G.
5194*
KORP, W.
5431*
KORT, W.J.
5105
KOSTENBAUDER, H.B.
5068*
KOSTER, J.F.
5364*
KOTZEN, L.
5142
KOWALEWSKI, K.
5019*
KRANT, S.M.
5439*
KRASNY, J.
4960
KRAWCZYNSKA, B.
5422
KREEL, L.
5141
KRETCHMER, N.
5095*
KREUNING, J.
5136*
KRISHNAMURTHI, D.
5056*
KROKHINA, E.M.
4956
KUBO, T.
5191*
KUCHENEECKER, S.L.
5046*
KUDREWICZ, L.
5164
KUKSIS, A.
5093*
KURATSUKA, H.
5335*
KURIMURA, O.
5147
KUSHCH, N.L.
5370*
KUTZNER, R.
5047*
LA RUSSO, N.F.
5488
LABUSQUIERE, R.
5516
LAGACE, R.
4974
LAHIRI, S.C.
5410
LAMBERT, R.
5180*
LAMEIJER, L.D.F.
5105
LANGE, E.
5245
LANKAU, C.A., JR.
5341
LANNON, J.
5303
LARSSON, B.
5106
LASTRA, M.P.
5443
LATTES, R.
5482
LAU, T.
5510
LAVIGNE, J.G.
4996
LAWSON, T.L.
5333
LEAO, A.S.
5507
LEBENTHAL, E.
5095*
LEBOWITZ, W.B.
5451
LEDERER, I.
5512
LEE, J.M.
5344
LEE, S.K.
5327*
LEHR, H.B.
5114
LEICHTER, J.
5174
LEIKINA, E.M.
5063*
LEITAO, O.
5015*
LEMARINIER, G.
5516
LEMMENS, H.A.J.
5522
LENGGENHAGER, K.
5336*
LENNE, Y.
5415
LEODOLTER, I.
5434
LEPOW, M.L.
5510
LEPP, A.
5098*
LERNER, C.
5214
LERNER, R.
5458
LEVITIN, H.
5453*
LEWIN, K.
5386*
LEWIS, E.A.
5235
LEWIS, H.M.
5303
LEWIS, M.I.
5301

NUMBERS FOLLOWED BY AN ASTERISK INDICATE ABSTRACTS. OTHER NUMBERS REFER TO CITATIONS.

EZHAVA, IA.P.
5222
E, T.S.
4974
EBER, C.S.
5073*
EBOW, C.
4963
LLEHEI, R.C.
5050
LLIBRIDGE, C.B.
4947*
N, K.-T.
5443
N, T.
5025*
NDENAUER, S.M.
5285*
NDNER, A.E.
5454*
NDNER, H.
5156
NDSAY, N.
5121*
NTHE, H.
5113
PSHUTZ, W.
5005*
QUORI, G.
5249
SICKY, J.
5356
U, Y.K.
5412*
CATELLI, G.
5182
EPER-SOETH, H.
5477
HR, E.
5207
MAN, F.
5128*
MBART BOSCH, A.
5509
NGMIRE, W.P., JR.
5473
NDH, G.
5354*
NDIN, P.
5395*
Z, A.
4959
MBEROPOULOS, S.
4958
YONS, A.S.
5267
YTKIN, M.I.
5433
AC SWEEN, R.N.M.
5273*
ACDICKEN, I.
5105
ACLENNAN, I.
5208
ADDING, G.F.
5353*
AEZAWA, H.
5076*

MAGOS, L.
5061*
MAHOUD, J.
5278
MAIMON, H.N.
5204
MAITRA, N.
5118
MAKI, S.
5020*
MAKI, T.
5080*
MALAGELADA, J.R.
5436*
MALLORY, P.A.
5049
MANIER, J.W.
5148
MANILDI, E.R.
5427*
MANKO, M.A.
5262
MANN, W.A.
5014*
MANSFIELD, C.M.
5177
MANTOVANI, P.
5003*
MANTZ, F.A.
5345
MARCHAND, C.
4996
MARCUS, R.
5334
MARGULIS, A.R.
5333
MARKS, I.N.
5462
MARMION, B.P.
5406
MARSDEN, D.S.
5155
MARSHAK, R.H.
5454*
MARTIN, L.W.
5251
MARTIN, P.
5230
MARTINI, G.A.
5441
MATROSOVA, E.M.
5034
MATSUDA, S.
5404*
MATSUMOTO, T.
5459
MATTHAUS, H.
4981*
MATTOCKS, A.R.
5084
MATUCHANSKY, C.
4982*
MATUTE, M.L.
5090
MAURER, W.
5099*
MAXWELL, J.D.
5169

MAYOVA, E.
5296
MC ALLISTER, J.S.
5252
MC ARTHUR, M.S.
5473
MC DIVITT, R.W.
5258
MC DONALD, F.K.
5466
MC GINTY, F.
5289*
MC KECHNIE, J.
5278
MC PHERSON, F.T.
5357
MC SHERRY, C.K.
5437*
MC SWAIN, B.
5340
MC SWEEN, R.N.M.
5428*
MCCUNE, W.S.
5212
MCDERMOTT, W.V. JR.
5080*
MCELWAIN, T.J.
5145
MCINTYRE, N.
5101
MEDLINE, A.
5057*
MELTZER, S.
5451
MENDOZA, C.B., JR.
5300
MENON,A.I.
5057*
MERANZE, D.R.
5192*
MERSEREAU, W.A.
5026*
MEYER, B.
5478
MEYER, W.
5050
MIENY, C.J.
5373
MILANO, S.
5352
MILLEDGE, R.D.
5338
MILLER, J.K.
5001*
MILLER, S.F.
5355*
MILLIGAN, F.D.
5204
MILLIS, R.R.
5386*
MINIAILO, D.D.
5082*
MIOTVEDT, T.
5242*
MIRAKHMEDOV, M.M.
5447
MITAKI, N.
5297

NUMBERS FOLLOWED BY AN ASTERISK INDICATE ABSTRACTS. OTHER NUMBERS REFER TO CITATIONS.

MITCHELL, J.D.
5274*
MIYAR GONZALEZ, A
5294
MOERTEL, C.G.
5475
MOLINE, E.
5292
MOLINO, D.
5446
MOMBELLO, R.A.
5205
MONROE, L.S.
5190
MONTAS, S.
5269*
MONTEIRO, E.H.
5327*
MONTES, M.
5183
MONTGOMERY, D.A.
5218
MOONEY, P.
5116
MOORE, J.G.
5024*
MOORE, T.C.
5324
MORAN, C.J.
5517
MOREIRA, H.
5508
MORELLO, D.C.
5459
MORGANO, G.
5387
MORIWAKI, S.
5307
MORSE, T.S.
5320
MOSS, A.A.
4993
MOSSINI, F.
5038
MOULAY, A.
5234
MOVSAS, S.
5503
MUGGIA, F.M.
5179*
MUHE, E.
5181*
MULLER, U.
5113
MUND, K.
5207
MURAI, N.
5308
MURPHY, G.P.
5053
MUTOVIN, G.R.
5089
MUZZIO, C.A.
5205
MYERS, R.N.
5262
MYREN, J.
5195*
MYRON, J.
4954
MZHEL'SKII, V.S.
5173
NADEAU, B.E.
4984*, 4985*
NAGAMATSU, Y.
5335*
NAHARA, G.
5074*
NAHRWOLD, D.L.
4994
NAIR, C.R.
5066*
NAKADAIRA, A.
5129*
NALIVAIKO, D.G.
5040
NANDI MAJUMDAR, A.P.
5079*
NAGVI, M.A.
5471
NARUMI, H.
5297
NARUMI, S.
5020*
NAVARRETE, N.
5153
NAZARIAN, I.
5513
NEGOMIREANU, T.
5124*
NEGRI, L.
5029*
NEILL, D.W.
4987*
NELSON, J.A.
4993, 5333
NELSON, M.
5151
NEMOROVSKII, L.E.
5089
NERI, A.
5432
NESTEL, P.J.
5109*
NEUPERT, G.
4957
NEWMAN, C.R.
5218
NEWSOME, B.
5362
NIEDZIELSKA, H.
5422
NIELSEN, M.H.
5193*
NILSSON, F.
5009
NKAJIMA, S.
5051
NOEIS, H.
5431*
NOCE, P.S.
5456*
NODA, A.
5051
NOFAL, M.
5506
NOLAN, N.G.
5126*
NOVIS, B.H.
5462
NOYES, D.H.
5017*
NOZDRACHEV, A.D.
5010
NUGUMANOVA, G.B.
5382*
O'DOHERTY, F.J.A.
5093*
O'DONNELL, J.M.
4980*
O'DONOVAN, D.J.
5116
O'KIEFFE, D.A.
5212
O'MARA, R.E.
5160
OBTULOWICZ, W.
5013*
OCARANZA, J.
5361
OCHI, C.
5307
OCHSNER, A.
5491*
OCKERMAN, P.A.
5133*
ODIEVRE, M.
5417
OELERICH, S.
5512
OGAWA, S.
5076*
OGILVIE, B.M.
5511
OH, K.S.
5154
OKADA, M.
5309
OLEA, M.
5498
OLIVEIRA, C.
5243
OLIVO, J.
5430*
ONSTAD, G.R.
5346
ORDA, R.
5260
ORTEGA, J.A.
5178*
ORVIS, A.L.
5365*
OSBORNE, J.W.
4950*
OSCARSON, J.
5140
OSTMANN, H.
5512
OSUNTOKUN, B.O.
5389*
OTHERSEN, H.B., JR.
5202
OTTENJANN, R.
5319

TESEN, E.A.
5456*
TOLENGHI, A.
5445
CEA, P.
5415
ADIA, J.
5117
ENS, M.P.
5196
A, S.
5147
AWA, K.
5377
IN, F.H.
5031
L'TSYN, A.A.
5448
LLAVICINI, G.
4970
LOMINO, H.
5499
LUMBO, P.J.
5330
NNUTI, F.
4966, 4967, 4968
NSU, D.
5180*
OLAGGI, J.A.
5418
PADOPOULOS, N.M.
5400*
PI, N.
5166
RBHOO, S.P.
5403*
RENT, M.
5220
RK, C.H.
5177, 5466
RODI, V.
5500
RTIN, J.
5251
RYNA, YE.V.
5092
SSARO, E., JR.
5128*
TRONE, E.
5387
TTERSON, F.J.
5331
WLOW, D.
5347
YNE, C.
5399*
ACOCK, M.
5279
ART, W.S.
4991
CHNIKOVA, L.V.
4961
IRO OLASO, V.
5509
NA, A.S.
5326*
NHOS, J.C.
5098*
PENTIKAINEN, P.
4998
PENTTILA, A.
4998
PEPPER, H.W.
4993
PEREZ, C.
5500
PERIANAYAGAM, W.J.
5314.
PETERS, T. JR.
5085
PETERSON, D.
5398*
PHILLIPS, R.W.
5427*
PHILLIPS, S.F.
4986*, 5229
PHIPPS, E.J.
5151
PIERCE, N.F.
5463
PIERZ, J.J.
5510
PINCHUCK, A.
5458
PLAA, G.L.
5081*
POCHACZEVSKY, R.
5159
POCHECHUEVA, G.S.
5450
POLK, H.C., JR.
5189
POMARE, E.W.
5006*
POMEL'TSOV, A.N.
5440
PORDI, G.
5091
PORTER, P.
5097*
POSTEUCA, M.
5214
POUCHE, A.
5358
POULAKAS, L.
4950*
POULSEN, K.
5409
POULSEN, R.
4960
POURHADI, R.
4953
POWELL, S.J.
5502
PREISIG,R.
5062*
PRESCOTT, R.J.
5021*
PRINCE, A.M.
5396*, 5397*
PRINGLE, R.
5185
PROCTOR, N.S.F.
5472
PRONIN, V.I.
5199
PROUDFOOT, E.
5406
PRUZANSKI, W.
5271*
PRYKE, E.S.
5109*
PRYTZ, H.
5429*
PUNCHENOK, N.A.
5383
QUAN, T.J.
5456*
QUELOZ, J.M.
5241*
QUINTENZ, M.
5087
RAFII, F.
5430*
RAFTERY, A.T.
5119
RAHBAR, A.
5300
RAKE, M.O.
5401*
RAMIREZ, E.
5361
RAMIREZ, R.
5499
RANCHOD, M.
5486
RASANEN, J.A.
5402*
RASK-MADSEN, J.
5193*
RAVASINI, R.
5149
RAVITCH, M.M.
5312
RAYUDU, G.V.
5253
REBOUL, M.
5411
RECANT, L.
5098*
RECORD, C.O.
5069*
REEDER, D.D.
5027*
REHM, W.S.
5017*
REHMAN, O.U.
5385*
REID, I.M.
4962
REITEMEIER, R.J.
5475
REMMELE, W.
5477
RENKER, H.
5058*
REYES, H.
5498
REYNOLDS, J.D.H.
5416
RHODES, R.S.
4999
RIBAUDO, J.M.
5491*

RICHARDS, F.
4991
RICHART, R.M.
5482
RICHTER, H.
5245
RIDLEY, P.T.
5014*
RIECKEN, E.C.
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RIIS, P.
5291*
RILL, A.
5372
RING, E.J.
5290*
RITLAND, S.
5134*
RIVERA, R.A.
5212
RIZZUTI, R.J.
5165
RO, J.S.
5369*
ROBBERECHT, P.
5047*
ROBINSON, A.V.
4999
ROCCHI, P.
5091
RODA, C.L.P.
5344
RODGER, M.R.
5349
RODIER, J.
5371
RODRIGUEZ-ANTUNEZ, A.
5184
RODRIGUEZ OCAMPO, C.
5368*
ROESCH, W.
5485
ROGERS, L.F.
5443
ROIGAARD-PETERSEN, H.
5079*
ROJAS, A.
5499
ROKKANEN, P.
5490
ROMANENKO, V.D.
5070*
ROMANI, L.
5166
ROMANO, A.
5003*, 5358
ROMANOVA, I.N.
5088
ROMANOVA, L.K.
5063*
ROMERO, E.
5499
ROSCH, J.
5290*
ROSCH, W.
5525
ROSE, R.C.
4994
ROSENBLATT, R.M.
5455*
ROSENQUIST, C.J.
5360
ROSENTHAL, W.S.
5430*
ROSSI, R.
5248
ROSSOLINI, A.
4969
ROTA MONEO, M.A.
5244
ROTH, R.H.
5286*
ROTHMAN, S.S.
4963
RUEIDGE, C.J.
5502
RUBIO, C.
5269*
RUEFF, F.L.
5163
RUIZ, C.J.
5050
RUOFF, H.J.
5033
RUOSLAHTI, E.
5402*
RUPP, N.
5161
RYAN, J.N.
5054*
RYBAKOVA, L.I.
4965
SAAVEDRA, P.
5170
SABESIN, S.M.
5390*
SABINE, J.R.
5067*
SAHA, S.
5066*
SAILER, D.
5485
SALE, J.K.
5052
SALEM, A.A.
5329
SALGANIK, R.I.
5039
SALGANIK, R. I.
5041
SALGARELLO, G.
5240*
SAMOKHVALOV, V.I.
5034
SANDBERG, A.A.
5053
SANDERS, I.
5200
SANDERS, S.S.
5017*
SANDIN, B.
5141
SANS SEGARRA, M.
5293
SANVORDEKER, D.R.
5068*
SAPUNAR, J.
5500
SARKANY, I.
5384
SATO, S.
5309
SAUER, W.G.
5330
SAVAGE, D.C.
5252
SAVILAHTI, E.
5237*
SAYEED, M.M.
4976*
SCALISE, G.
5394*
SCHAEFER, R.A.
5197
SCHALL, G.L.
5479
SCHENONE, H.
5499
SCHICKEDANZ, H.
5246, 5316
SCHILLER, M.
5320
SCHLEUPNER, C. J.
5366*
SCHMEER, A.C.
5099*
SCHMIDT, H.L.
5485
SCHNACK, H.
5431*
SCHNEER, J.H.
5282
SCHOENEMANN, J.
5172, 5363
SCHOFIELD, P.F.
5236, 5266
SCHRAMM, H.
5316
SCHREIBER, D.S.
5238*
SCHREIER, R.
5083*
SCHUBERT, W.K.
5251
SCHULTHEISS, H.R.
5219
SCHULTZ, E.
4955
SCHULTZ, L.S.
5050
SCHULTZE, B.
5099*
SCHUMACHER, G.H.
4955
SCHUMAN, L.
5219
SCHWARTZ, I.R.
5458
SCHWARTZ, M.
5193*
SCHWARTZ, M.Z.
5261
SCHWARZ, F.J.
4983*

NUMBERS FOLLOWED BY AN ASTERISK INDICATE ABSTRACTS. OTHER NUMBERS REFER TO CITATIONS.

CIACCA, A.
5432
COTT, H.W., JR.
5340
COTT, C.J.
5323
CRATCHERD, T.
5048
ECORD, D.
5019*
EDLARIK, K.
5255
EELIG, H.P.
5113
EGAL, S.
5094*
EGERSTROM, A.
5007*
ELAWRY, H.
5098*
ELIGER, G.
5239*
EMENIUK, E.IA.
5223
EPPALA, M.
5402*
ERENY, G.
5425
ERGEVNIN, V.V.
5268
ETIEY, L.
5234
EWING, K.
5033
HABANOVA, N.O.
5092
HAH, I.C.
5519*
HAPLEY, J.M.
5381*
HATALOV, V.N.
5440
HEAHAN, D.G.
5217*
HEINER, H.J.
5306
HEPHERD, A.M.M.
5216*
HERLOCK, S.
5135*, 5403*
HINDO, K.
5308
HINOZUKA, H.
5071*
HIRACHI, R.
5405*
HIRAZI, P.H.
5253
HIRES, D.L.
5391*
HOCHAT, S.J.
5457
HUCK, T.J.
5030
ILSETH, CH.
5139
ILVA, J.R.
5520*

SILVIS, S.E.
5423*
SIMONOV, V.V.
5433
SIMOONS, F.J.
5283
SIMSON, I.W.
5127*
SINGH, S.
5315
SINNIAH, R.
4987*
SIVASOMBOON, B.
5016*
SKATULSKA-SURMACKA, T.
5422
SKLAN, D.
4988*
SKREDE, S.
5130*, 5134*
SLAPAK, M.
5080*
SLATIS, P.
5490
SLAVIN, G.
5141
SLEE, R.G.
5364*
SLEZAK, Z.
5296
SLOTH, K.
5429*
SMITH, F.H.
4995
SMITH, J.A.
5408
SMITH, M.
5376
SMITH, M.C.
5442
SMITH, M.W.
4980*
SNARY, D.
5031
SNYDER, R.D.
5355*
SOCCORSI, P.
5432
SOJKA, W.J.
5470
SOLYMOSS, B.
5065*
SORENSEN, T.
5317
SORIAL, A.
5489
SOUTHREN, A.L.
5430*
SPANGLER, S.G.
5017*
SPITKOVSKII, D.M.
5063*
SPRINZ, H.
5217*
STADLER, J.
5260
STAGG, L.H.
5306

STAGNO, S.
5170, 5500
STATES, B.
5094*
STEFFEN, C.
5044*
STEINFELD, J.R.
5265
STEPHENS, D.H.
5126*
STEPHENS, F.D.
5310
STEPHENS, R.L.
5179*
STERIOFF, S., JR.
5312
STERN, R.B.
5169
STEWART, W.K.
5216*
STONE, H.H.
5463, 5464
STORMEY, N.
5140
STOTT, A.W.
5122*
STRACHAN, A.W.B.
5226
STURZENHOFECKER, P.
5036
SUBIAERE, V.
5500
SUKENO, N.
5404*
SUMIKOSHI, Y.
5309
SUMMERSKILL, W.H.
5436*
SUN, C.N.
5280
SUNDGREN, R.
5140
SUNSHINE, P.
5095*
SUZUKI, T.
5335*
SWENSON, C.
5439*
SYKES, P.A.
5266
SZARFMAN, A.
5496*
SZEKELY, F.
5499
TACHIBANA, K.
5035
TAGORE, N.K.
5298
TAICHMAN, N.
4948*
TAKANO, M.
5309
TAKASAN, H.
5377
TALAL, N.
5479
TANAKA, N.
5102

NUMBERS FOLLOWED BY AN ASTERISK INDICATE ABSTRACTS. OTHER NUMBERS REFER TO CITATIONS.

TANEJA, O.P.
5298
TANN, E.
5297
TANSY, M.F.
5295
TARPLEY, T.M.
5479
TASLER, J.
5013*
TASMAN-JONES, C.
5467
TATEDA, A.
5405*
TAYLOR, A., JR.
5465
TAYLOR, A.N.
4989*
TAYLOR, D.M.
5145
TEAGUE, R.H.
5332
TERESHCHENKO, I.P.
4965
TERRAGNA, A.
4969
TEWARI, S.N.
5233
THOMAKOS, A.P.
5400*
THOMAS, E.
5407
THOMAS, G.G.
5305
THOMAS, H.C.
5428*
THOMAS, J.M.
5520*
THOMPSON, E.H.
5461
THOMPSON, J.C.
5027*
THOMPSON, R.P.H.
5169
THURNHERR, N.
5426*
THURSFIELD, W.R.R.
5146
TILAK, T.B.
5056*
TILLES, J.G.
5393*
TIMLIOGLU, B.E.
5042
TINIAKOS, G.
5400*
TISSOT, E.
5224
TITUS, J.L.
5365*
TKACHENKO, L.I.
5370*
TKACZEWSKI, W.
5422
TODA, Y.
5051
TOMASINI, J.T.
5269*
TOMCZYK-BUDZINSKA, H.
5422
TOMPKINS, R.K.
5046*
TORRANCE, H.B.
5208
TORRES, A.
5263
TORRES, P.
5153
TOTOVIC, V.
4974
TOULOUKIAN, R.J.
5286*, 5481
TOWNLEY, R.R.W.
5152, 5274*
TRAIANOS, G.P.
5400*
TRAPNELL, D.H.
5267*
TRAVIS, J.
5049
TRIER, J.S.
5238*
TRIPPESTAD, A.
5242*
TROFIMOV, V.M.
5433
TRUELOVE, S.C.
5326*
TSAREV, B.M.
5268
TSYBULIAK, S.N.
5171
TSYBYRNE, K.A.
5223
TUCKER, G.L.
5349
TULIN, M.
5469
TURAKULOV, YA.KH.
5447
TURCHINI, J.P.
4953
TURK, J.L.
5517
TWOHIG, A.M.
5466
TYGSTRUP, N.
5131*
TYLEN, U.
5139
UCHIDA, K.
5335*
ULLIS, K.C.
5455*
URANO, M.
5102
UTHMAN, S.M.
5452, 5515
UZER, F.
5213
VALENTINO, B.
5086
VAN BERKEL, T.J.C.
5364*
VAN DER LINDEN, W.
4946*
VAN HEYNINGEN, W.E.
5111*
VANINI, V.
5182
VANNOTTI, A.
5380
VAPAATALO, H.
4998
VARCO, R.L.
5261
VARGAS, W.
5270*
VARMA, K.K.
5310
VECCHIO-BLANCO, C.DEL.
5414
VELTKAMP, J.J.
5136*
VENNES, J.A.
5138
VESTFRID, M.A.
5347
VIDELA, L.
5060*
VIGNAL, J.
5234
VINCENS, A.
5371
VINIK, A.I.
5375
VINOGRADOVA, M.F.
5082*
VIOLINI, A.
5292
VITANI, C.
5180*
VITERI, F.E.
5270*
VOIROL, M.W.
5188
VOYLES, N.
5098*
VTYURIN, B.V.
5448
VUOPIO, P.
5402*
WAGNER, H.N. JR.
5128*
WALDRAM, R.
5281
WALDRON, C.W.
5257
WALKER, L.L.
5211
WALKER, S.H.
5366*
WALLNOFER, H.
5434
WALMSLEY, P.
5426*
WALTMAN, A.C.
5290*
WANSTRUP, J.
5193*
WARD, L.E.
5330
WARR, M.
5465

NUMBERS FOLLOWED BY AN ASTERISK INDICATE ABSTRACTS. OTHER NUMBERS REFER TO CITATIONS.

WARREN, R.E.
5271*
WARREN, W.D.
5339
WASSEF, S.A.
5501
WASSERMAN, R.H.
4989*
WATSON, P.G.
5151
WATT, J.
5334
WATTERS, W.B.
5120
ATTS, J.R.
5151
ATTUONE, N.H.
5496*
EAVER, P.C.
5287*
EBER, A.L.
5154
EBER, F.
4979*
EE, G.C.
5263
EENS, H.S.
5338
EGMANN, A.
5058*
EINSTEIN, L.D.
5142
EISS, H.D.
5161
EISSMAN, A.
5431*
EISZ, D.
5349
ELLS, R.F.
5224
ELSH, R.A.
5188
ENZL, M.
5434
ESTBROOK, W.J.
5105
HALEN, J.F.
5165
HEELER, M.H.
5021*
HEELESS, C.R., JR.
5461
HERRETT, J.R.
5348
HITAKER, J.R., JR.
5355*
HITE, A.F.
5154
HITE, H.H.
5280
HITE, I.N.H.
5061*, 5084
HITE, J.J.
5312
HITE, R.G.
5428*
HYTE, H.M.
5109*
WIESNER, W.
5161
WILBER, R.D.
5416
WILCHIRT, E.
5175
WILLIAMS, M.J.
5342
WILLIAMS, R.
5169, 5401*
WILSON, A.J.
5233
WILSON, J.R.
5381*
WINGATE, D.L.
4986*
WINSEY, H.S.
5165
WINSHIP, D.H.
5030
WISHAHI, A.
5501
WISS, O.
4979*
WITSCHI, H.
5081*
WOESNER, M.E.
5200
WOJTALIK, R.S.
5285*
WOLF, F.S.
5465
WOLF, R.O.
5479
WOLFE, L.
5398*
WOLOSHIN, H.J.
5241*
WOMACK, N.A.
5228
WOOD, D.E.
5123*
WOOD, J.D.
5002*
WOOLER, G.H.
5187
WORMSLEY, K.G.
5052, 5216*
WULFF, H.R.
5291*
YAMAMOTO, T
4974
YANGUNAEV, R.A.
5447
YARDLEY, J.H.
5100*
YASUTOMI, M.
5308
YEUNG, P.K.
5155
YORK, E.L.
5373
YOSHIMORI, M.
4947*
YOUSEF, I.M.
5093*
ZAKI, K.
5501
ZAPPIA, L.
5292
ZAPPIS, L.
5038
ZASTROW, R.
5172, 5363
ZBARSKY, S.H.
4960
ZEIN, M.S.
5506
ZELEDON PEREZ, M.
5359
ZEPPA, R.
5339
ZETTERBERG, A.
5157
ZEUNER, L.
5255
ZIEGENFUSS, J.F.
5374
ZONTINE, W.J.
5008
ZSIGMOND, G.
5065*
ZUFAROV, K.A.
4961, 4973
ZWIERZ, C.
5164
ZWOLENSKI, R.
5151

- ABDOMEN
  - ABSCESS, 5459
  - LYMPHATICS
    - CROHNS DISEASE, 5526
    - SARCOIDOSIS, 5526
  - RADIOLOGY
    - PERFORATION, 5207
  - SURGERY
    - COMPLICATIONS, 5463
  - TRAUMA, 5460, 5490
    - SCANNING, SCINTILLATION, 5160
    - SEPSIS, 5463

- ABDOMEN, ACUTE
  - BLOOD
    - LIPIDS, 5465
  - DISEASES ASSOCIATED WITH
    - SURGERY, 5471

- ABSCESS
  - ABDOMEN, 5459
  - AMEBIASIS
    - LIVER, 5505
  - APPENDECTOMY
    - DRUG TREATMENT, 5325
  - LIVER
    - AMEBIASIS, 5491*
    - DISEASES ASSOCIATED WITH, 5491*

- ABSORPTION
  - ANTIBACTERIALS
    - DRUG EFFECTS ON, 4996
  - BILE ACIDS
    - INTESTINE, 4988*
  - BLEEDING
    - SHOCK, 4999
  - CALCIUM
    - DRUG EFFECTS ON, 4990*
    - INTESTINE, 4990*
    - SMALL INTESTINE, 4980*
    - VITAMIN D, 4980*
  - ELECTROLYTE
    - INTESTINE, 4992
    - JEJUNUM, 4982*
    - PROSTAGLANDIN, 4982*
  - FATTY ACIDS
    - INTESTINE, 4988*
    - JEJUNUM, 4977*
    - PHYSICAL FACTORS, 4977*
  - GASTROINTESTINAL
    - MAGNESIUM, 5103
  - GLUCOSE
    - BILE ACIDS, 4986*
    - JEJUNUM, 4982*, 4986*
    - PROSTAGLANDIN, 4982*
    - SMALL INTESTINE, 4981*
  - INTESTINE
    - SHOCK, 4999
  - IRON
    - DIETARY FACTORS, 4995
    - PANCREATECTOMY, 4987*
    - SMALL INTESTINE, 4995
  - LIVER
    - GALACTOSE, 4985*
  - PHOSPHATE
    - INTESTINE, 4989*
    - VITAMIN D, 4989*
  - SMALL INTESTINE
    - TECHNIQUES, 4983*
    - TRACE ELEMENT, 4983*
  - SODIUM
    - SMALL INTESTINE, 4981*
  - SUGAR
    - INTESTINE, 4992
  - VITAMIN B12
    - DIARRHEA, 5270*
    - MALNUTRITION, 5270*
  - VITAMIN C
    - HORMONE EFFECTS ON, 4979*
    - SMALL INTESTINE, 4979*
  - WATER
    - BILE ACIDS, 4986*
    - JEJUNUM, 4982*, 4986*
    - PROSTAGLANDIN, 4982*

- ACHLORHYDRIA
  - SEE ALSO ACID SECRETION

- ACID PHOSPHATASE
  - SEE PHOSPHATASE, ACID

- ACID SECRETION
  - SEE ALSO ACHLORHYDRIA
  - SEE ALSO HYPERCHLORHYDRIA
  - SEE ALSO HYPOCHLORHYDRIA
  - DUODENUM
    - MOTILITY, 5034
  - GASTRITIS, ATROPHIC, 5158
  - STOMACH, 5440
    - ACIDITY, 5018*, 5021*
    - ADRENERGIC BLOCKING AGENTS, 5025*
    - ANTIDEPRESSANTS, 5014*
    - CYCLIC ADENOSINE MONOPHOSPHATE, 5020*
    - DRUG EFFECTS ON, 5023*
    - FATTY ACIDS, 5019*
    - GASTRITIS, 5195*
    - GENETIC FACTORS, 5041
    - GLUCOSE, 5024*
    - HISTAMINE, 5015*, 5016*
    - HORMONE CONTROL, 5041
    - HORMONE EFFECTS ON, 5016*, 5029*
    - INHIBITION, 5017*
    - INSULIN, 5028*
    - NARCOTICS, 5014*
    - NERVOUS CONTROL, 5028*
    - PENTAGASTRIN, 5015*, 5021*
    - PROSTAGLANDIN, 5036
    - STEROID, 5018*
    - TECHNIQUES, 5030, 5034
    - TRANQUILIZERS, 5014*

- ACIDITY
  - PEPSIN, 5118
  - STOMACH
    - ACID SECRETION, 5018*, 5021*
    - ULCER, 5026*

- ADENOSINE TRIPHOSPHATASE
  - ION TRANSPORT, 5116
  - LIVER
    - ANTINEOPLASTIC AGENTS, 5088

- ADENYL CYCLASE
  - STOMACH
    - HISTAMINE, 5039
    - PENTAGASTRIN, 5039

HESIONS
- INTESTINE, 5254
  - CHILDREN, 5254
- LARGE INTESTINE
  - DRUG TREATMENT, 5320
  - SIMULATION, 5320

HESIVES
- SEE TISSUE ADHESIVES

RENERGIC BLOCKING AGENTS
- STOMACH
  - ACID SECRETION, 5025*
  - CIRCULATION, 5025*

LATOXIN
- LIVER DISEASE
  - REVIEWS, 5378

E FACTORS
- SEE ALSO CHILDREN, NEONATE
- GALLBLADDER
  - TORSION, 5444
- LIVER
  - GLUCOSE-6-PHOSPHATE DEHYDROGENASE, 5092
- SMALL INTESTINE
  - DISACCHARIDASE, 5096*
  - DISACHARIDASE, 5095*
- STOMACH
  - SECRETION, 5022*

BUMIN
- METABOLISM
  - HYPERBILIRUBINEMIA, 5079*
- SYNTHESIS
  - LIVER, 5085

COHOL
- FATTY LIVER
  - SIMULATION, 5066*
- LIPIDS
  - METABOLISM, 5066*
- LIVER
  - ENZYMES, 5073*
  - METABOLISM, 5060*
- STOMACH
  - ULTRASTRUCTURE, 4947*

COHOLIC LIVER DISEASE
- SEE LIVER DISEASE, ALCOHOLIC

COHOLISM
- PANCREAS
  - ASCITES, 5337

KALINE PHOSPHATASE
- SEE PHOSPHATASE, ALKALINE

KALOIDS
- METABOLISM
  - LIVER, 5064

KALOSIS
- ANOMALY, CONGENITAL
  - DIARRHEA, 5453*

EBIASIS
- DIAGNOSIS
  - TECHNIQUES, 5164
- DISEASES ASSOCIATED WITH
  - DRUG TREATMENT, 5502
- DRUG TREATMENT, 5495*
- INTESTINE
  - DRUG TREATMENT, 5500
- LIVER
  - ABSCESS, 5491*, 5505
  - DRUG TREATMENT, 5497, 5504
  - REVIEWS, 5505
  - SURGERY, 5503

AMINO ACIDS
- BLOOD
  - LIVER INJURY, 5086
- LIVER
  - LIVER INJURY, 5054*
- LIVER DISEASE, ALCOHOLIC
  - THERAPY, 5423*
- LIVER INJURY
  - CARBON TETRACHLORIDE, 5086
- METABOLISM
  - LIVER, 5094*
  - PANCREAS, 4951
- PANCREAS
  - CHOLINERGIC AGENTS, 5047*
  - HORMONE EFFECTS ON, 5047*

AMINOPEPTIDASE
- BLOOD
  - CIRRHOSIS, 5427*
  - ISOENZYMES, 5427*

AMYLASE
- BILE, 5076*

ANASTOMOSIS
- SMALL INTESTINE
  - DRUG EFFECTS ON, 5244

ANESTHETICS
- JAUNDICE
  - DRUG-INDUCED, 5381*

ANEURYSM
- AORTA
  - PEPTIC ULCER, 5230
- ARTERY
  - JAUNDICE, OBSTRUCTIVE, 5458

ANGIOGRAPHY
- BILIARY TRACT
  - TECHNIQUES, 5173
- GASTROINTESTINAL
  - BLEEDING, 5142, 5168
  - NEOPLASMS, 5139
- LIVER
  - NEOPLASMS, MALIGNANT, 5142
- ZOLLINGER-ELLISON SYNDROME, 5125*

ANOMALY
- CECUM, 5315
- ILEUM, 5315

ANOMALY, CONGENITAL
- ALKALOSIS
  - DIARRHEA, 5453*
- BILE DUCT
  - DILATATION, 5437*

  - COLON
    - CHOLECYSTITIS, 5306
    - SURGERY, 5324
  - GASTROINTESTINAL
    - SURGERY, 5468
  - PANCREAS, 5341

- ANORECTUM
  - FISTULA
    - SURGERY, 5309
  - FOREIGN BODIES, 5297

- ANOREXIA
  - CELIAC DISEASE
    - CHILDREN, 5272*

- ANTACIDS
  - STOMACH
    - MOTILITY, 5011

- ANTIBACTERIALS
  - ABSORPTION
    - DRUG EFFECTS ON, 4996
  - LIVER
    - ENZYMES, 4969

- ANTIBIOTICS
  - SEE ALSO ANTIBACTERIALS, DRUG TREATMENT
  - LIVER
    - ENZYMES, 4969

- ANTICONVULSANTS
  - LIVER
    - EXCRETION, 5051
  - PANCREAS
    - EXCRETION, 5051

- ANTIDEPRESSANTS
  - STOMACH
    - ACID SECRETION, 5014*

- ANTIEMETICS
  - NAUSEA, 5475
  - VOMITING, 5475

- ANTIGEN, AUSTRALIA
  - CARRIER STATE
    - CHILDREN, 5408
    - LIVER FUNCTION TESTS, 5400*
  - CHEMICAL COMPOSITION
    - CARBOHYDRATE, 5406
  - EPIDEMIOLOGY
    - LIVER DISEASE, 5414
  - HEPATITIS, CHRONIC, 5422
  - HEPATITIS, VIRAL, 5402*
    - DIAGNOSIS, 5171
  - LIVER
    - HEPATITIS, CHRONIC, 5394*
    - NEOPLASMS, MALIGNANT, 5402*
  - PHYSICAL PROPERTIES, 5393*
  - RADIOIMMUNOASSAY
    - TECHNIQUES, 5397*
  - TECHNIQUES, 5147, 5151, 5404*
  - TOXICITY, 5399*

- ANTINEOPLASTIC AGENTS
  - JAUNDICE
    - DRUG-INDUCED, 5387
  - LIVER
    - ADENOSINE TRIPHOSPHATASE, 5088
    - MORPHOLOGY, 4966, 4967, 4968

- ANTISPASMODICS
  - DRUG METABOLISM
    - TRACER STUDY, 4998

- ANTRECTOMY
  - SEE ALSO GASTRECTOMY
  - SEE ALSO STOMACH, SURGERY
  - DUODENUM
    - NUCLEIC ACIDS, 4949*
  - STOMACH
    - NUCLEIC ACIDS, 4949*

- ANTRUM
  - SEE ALSO STOMACH

- ANUS
  - SEE ALSO LARGE INTESTINE
  - SYPHILIS
    - SURGERY, 5301

- AORTA
  - ANEURYSM
    - PEPTIC ULCER, 5230

- APPENDECTOMY
  - ABSCESS
    - DRUG TREATMENT, 5325
  - APPENDICITIS, 5316

- APPENDICITIS
  - APPENDECTOMY, 5316

- APPENDIX
  - SEE ALSO LARGE INTESTINE
  - DRUG EFFECTS ON, 5292

- ARTERY
  - ANEURYSM
    - JAUNDICE, OBSTRUCTIVE, 5458

- ASCARIASIS
  - LIVER
    - ETIOLOGY, 5507

- ASCITES
  - PANCREAS
    - ALCOHOLISM, 5337

- ASPIRIN
  - PEPTIC ULCER
    - ENDOSCOPY, 5229

- ATRESIA
  - BILIARY TRACT
    - NERVOUS SYSTEM, 5445
  - ESOPHAGUS
    - SURGERY, 5182
  - SMALL INTESTINE
    - CONGENITAL, 5246
    - NEONATE, 5246

- ATROPHY
  - VILLI
    - RADIATION, 4959

NUMBERS FOLLOWED BY AN ASTERISK INDICATE ABSTRACTS. OTHER NUMBERS REFER TO CITATIONS.

- TOIMMUNITY
  - CELIAC DISEASE
    - CHILDREN, 5273*
  - CIRRHOSIS, BILIARY, 5376
  - HEPATITIS, CHRONIC, 5376
  - SALIVARY GLANDS
    - SJOGRENS SYNDROME, 5479

- TERIA
  - CIRRHOSIS
    - IMMUNOLOGY, 5428*
  - WHIPPLES DISEASE
    - ETIOLOGY, 5280

- OARS
  - SEE FOREIGN BODIES

- E
  - AMYLASE, 5076*
  - CHEMICAL COMPOSITION
    - CHOLECYSTECTOMY, 5436*
  - ELECTROLYTE
    - CALCIUM, 5070
  - EXCRETION
    - CONTRAST MEDIA, 4993
    - PHENOBARBITAL, 4993
  - LIVER
    - PHOSPHATASE, 5070
  - SECRETION
    - BILE ACIDS, 5062*
    - CONTRAST MEDIA, 5062*
    - PHENOBARBITAL, 5065*
    - STEROID, 5065*
    - SULFOBROMOPHTHALEIN, 5062*

- E ACIDS
  - ABSORPTION
    - INTESTINE, 4988*
  - BILE
    - SECRETION, 5062*
  - CHOLELITHIASIS, 4946*
  - EXCRETION
    - CARBOHYDRATE, 5109*
    - DIETARY FACTORS, 5109*
  - GLUCOSE
    - ABSORPTION, 4986*
  - LIVER
    - MORPHOLOGY, 4946*
  - SECRETION
    - CHOLECYSTECTOMY, 5436*
    - INTESTINE, 4988*
  - SYNTHESIS
    - THYROID, 5077*
  - WATER
    - ABSORPTION, 4986*

- DUCT
  - DILATATION
    - ANOMALY, CONGENITAL, 5437*
    - SURGERY, 5437*
  - ENDOSCOPY, 5138
  - HYPERPLASIA
    - COMPLICATIONS, 5439*
  - RADIOLOGY, 5161
  - TRAUMA
    - SURGERY, 5473

- SALTS
  - SEE BILE ACIDS

- BILIARY DISEASE
  - RADIOLOGY, 5167

- BILIARY TRACT
  - ANGIOGRAPHY
    - TECHNIQUES, 5173
  - ATRESIA
    - NERVOUS SYSTEM, 5445
  - ENDOSCOPY
    - TECHNIQUES, 5148
  - FISTULA, 5225
  - NEOPLASMS, MALIGNANT
    - SURGERY, 5243
  - OBSTRUCTION
    - IMMUNOLOGY, 5426*
  - RADIOLOGY, 5163
  - STENOSIS
    - SURGERY, 5446
  - SURGERY, 5163
    - PANCREATITIS, 5355*

- BILIRUBIN
  - METABOLISM
    - PHENOBARBITAL, 5065*
    - PHOTOTHERAPY, 5068*
    - STEROID, 5065*
    - VITAMIN B2, 5068*
  - PHYSICAL PROPERTIES
    - IRRADIATION, 5110*

- BINDING
  - SEE METABOLISM
  - ESTROGENS
    - PANCREAS, 5053
  - LIVER
    - CARBON TETRACHLORIDE, 5091
    - NUCLEIC ACIDS, 5091

- BIOPSY
  - COLON
    - NEOPLASMS, MALIGNANT, 5317
  - LIVER
    - TECHNIQUES, 4954
  - PANCREAS
    - TECHNIQUES, 5140
  - RECTUM
    - NEOPLASMS, MALIGNANT, 5317
  - SMALL INTESTINE, 5441
    - CHILDREN, 5137, 5152
    - TECHNIQUES, 5137, 5152
  - STOMACH, 5127*
    - TECHNIQUES, 5140

- BLEEDING
  - COLON
    - DIVERTICULUM, 5290*
  - DUODENUM
    - NEOPLASMS, 5249
  - GASTRODUODENAL
    - SURGERY, 5203
  - GASTROINTESTINAL
    - ANGIOGRAPHY, 5142, 5168
  - ILEUM
    - NEOPLASMS, MALIGNANT, 5257
  - LARGE INTESTINE
    - DIVERTICULUM, 5296
  - LIVER
    - PARASITES AND PARASITIC DISEASE, 5509

- PREGNANCY, 5480
- PEPTIC ULCER
  - PYLOROPLASTY, 5219
  - SURGERY, 5236
  - VAGOTOMY, 5219
- SHOCK
  - ABSORPTION, 4999
- STOMACH
  - ULCER, 5026*

BLIND LOOP SYNDROME
- DISEASES ASSOCIATED WITH, 5469

BLOOD
- AMINO ACIDS
  - LIVER INJURY, 5086
- AMINOPEPTIDASE
  - CIRRHOSIS, 5427*
  - ISOENZYMES, 5427*
- CALCIUM
  - NEOPLASMS, MALIGNANT, 5179*
- GLUTAMYL TRANSPEPTIDASE, GAMMA
  - METASTASES, 5144
- LIPIDS
  - ABDOMEN, ACUTE, 5485
  - CHOLELITHIASIS, 5122*
  - PANCREATITIS, 5485
- PROTEIN
  - LIVER DISEASE, 5175

BLOOD FLOW
- SEE CIRCULATION

CALCIFICATION
- GALLBLADDER
  - NEOPLASMS, MALIGNANT, 5443
- SMALL INTESTINE
  - NEONATE, 5265
  - SURGERY, 5265

CALCIUM
- ABSORPTION
  - DRUG EFFECTS ON, 4990*
  - INTESTINE, 4990*
  - SMALL INTESTINE, 4980*
  - VITAMIN D, 4980*
- BILE
  - ELECTROLYTE, 5070
- BLOOD
  - NEOPLASMS, MALIGNANT, 5179*
- ESOPHAGUS
  - NEOPLASMS, MALIGNANT, 5179*
- STOMACH
  - SECRETION, 5032

CANCER
- SEE NEOPLASMS, MALIGNANT

CARBOHYDRATE
- SEE ALSO SPECIFIC SUGARS
- ANTIGEN, AUSTRALIA
  - CHEMICAL COMPOSITION, 5406
- BILE ACIDS
  - EXCRETION, 5109*
- CHOLESTEROL
  - METABOLISM, 5109*

CARBON TETRACHLORIDE
- HISTAMINE
  - METABOLISM, 5410
- LIVER
  - BINDING, 5091
  - ENZYMES, 5449
- LIVER INJURY
  - AMINO ACIDS, 5086
- NUCLEIC ACIDS
  - SYNTHESIS, 5448

CARBONIC ANHYDRASE
- STOMACH
  - CYCLIC ADENOSINE MONOPHOSPHATE, 5020*

CARCINOGENS
- STOMACH
  - NEOPLASMS, MALIGNANT, 5192*

CARRIER STATE
- ANTIGEN, AUSTRALIA
  - CHILDREN, 5408
  - LIVER FUNCTION TESTS, 5400*

CATECHOLAMINES
- METABOLISM
  - PEPTIC ULCER, 5222

CATHARTICS
- SEE LAXATIVES

CECUM
- SEE ALSO LARGE INTESTINE
- ANOMALY, 5315
- TUBERCULOSIS
  - REGIONAL ENTERITIS, 5519*
- VOLVULUS, 5300
  - SURGERY, 5298

CELIAC DISEASE
- ANOREXIA
  - CHILDREN, 5272*
- AUTOIMMUNITY
  - CHILDREN, 5273*
- CHILDREN, 5276
- DIETARY FACTORS
  - TOXICITY, 5274*
- PSYCHOLOGICAL FACTORS
  - CHILDREN, 5272*

CERULOPLASMIN
- HEPATITIS, VIRAL
  - PROGNOSIS, 5124*

CHEMICAL COMPOSITION
- ANTIGEN, AUSTRALIA
  - CARBOHYDRATE, 5406
- BILE
  - CHOLECYSTECTOMY, 5436*
- LIVER
  - IODINE, 5447
  - PROTEIN, 5447
- STOMACH, 5040

CHEMICAL PROPERTIES
- LIVER
  - REGENERATION, 5063*
- TRYPSIN, 5049

CHEMOTHERAPY

  HELMINTHIASIS, 5516
  INTESTINE
    DISEASES, 5264
  LIVER
    NEOPLASMS, MALIGNANT, 5372

HILDREN
  SEE ALSO NEONATE, AGE FACTORS

    , 5237*
  ANTIGEN, AUSTRALIA
    CARRIER STATE, 5408
  CELIAC DISEASE, 5276
    ANOREXIA, 5272*
    AUTOIMMUNITY, 5273*
    PSYCHOLOGICAL FACTORS, 5272*
  DIARRHEA
    THERAPY, 5478
  HEPATITIS, CHRONIC
    REVIEWS, 5417
  HIRSCHSPRUNGS DISEASE
    SURGERY, 5312
  INTESTINE
    ADHESIONS, 5254
  LIVER
    NEOPLASMS, MALIGNANT, 5370*
  PERITONITIS
    INFECTION, BACTERIA, 5457
  SCHISTOSOMIASIS
    ETIOLOGY, 5501
  SMALL INTESTINE
    BIOPSY, 5137, 5152
  SUGAR
    MALABSORPTION, 5282

HOLANGIOGRAPHY
  SEE ANGIOGRAPHY

HOLECYSTECTOMY
  BILE
    CHEMICAL COMPOSITION, 5436*
  BILE ACIDS
    SECRETION, 5436*

IOLECYSTITIS
  COLON
    ANOMALY, CONGENITAL, 5306
  ETIOLOGY, 5435*
    SALMONELLOSIS, 5452

IOLEDOCHOLITHIASIS
  THERAPY, 5451

IOLELITHIASIS
  BILE ACIDS, 4946*
  BLOOD
    LIPIDS, 5122*

IOLELITIASIS
  DIAGNOSIS, 5122*

OLERA
  ILEUM
    ION TRANSPORT, 4978*
  SMALL INTESTINE
    PEROXIDASE, 5100*
  TOXIN
    GANGLIOSIDES, 5111
    INHIBITION, 5483

CHOLESTASIS
  ETIOLOGY
    SYPHILIS, 5384
  SIMULATION
    NAPHTHYLISOTHIOCYANATE, ALPHA,
      5081*

CHOLESTEROL
  LIVER
    JAUNDICE, OBSTRUCTIVE, 5075*
    PRECANCER, 5067*
  METABOLISM
    CARBOHYDRATE, 5109*
    DIETARY FACTORS, 5109*
    JAUNDICE, OBSTRUCTIVE, 5075*
    SMALL INTESTINE, 5101
    THYROID, 5077*
  SYNTHESIS
    ETHIONINE, 5067*

CHOLINE
  DEFICIENCY
    DRUG METABOLISM, 5059*

CHOLINERGIC AGENTS
  PANCREAS
    AMINO ACIDS, 5047*

CHYMOTRYPSIN
  DUODENUM
    HORMONE EFFECTS ON, 5052

CIRCULATION
  STOMACH
    ADRENERGIC BLOCKING AGENTS, 5025*

CIRRHOSIS
  BLOOD
    AMINOPEPTIDASE, 5427*
  COMPLICATIONS
    HEPARIN, 5431*
    LIVER COMA, 5429*
    SURGERY, 5434
  IMMUNOLOGY
    BACTERIA, 5428*
  LIVER
    IRON, 4987*
    MORPHOLOGY, 5433
    ULTRASTRUCTURE, 5432
  LIVER FUNCTION TESTS, 5133*
  PROGNOSIS, 5424*
    LIVER FUNCTION TESTS, 5131*
  STEROID
    METABOLISM, 5430*

CIRRHOSIS, BILIARY
  AUTOIMMUNITY, 5376
  IMMUNOLOGY, 5426*

CITRIC ACID
  FATTY ACIDS
    SYNTHESIS, 5072*

CLOTTING
  HEPATITIS, VIRAL, 5133*
  LIVER
    SURGERY, 5369*
  LIVER COMA
    PROGNOSIS, 5132*

- LIVER DISEASE, 5134*, 5135*, 5136*, 5401*, 5403*
    - DIAGNOSIS, 5132*

COENZYMES
- FATTY ACIDS
    - SYNTHESIS, 5072*

COLITIS
- SEE ALSO ULCERATIVE COLITIS

COLITIS, GRANULOMATOUS
- ILEUM
    - RADIOLOGY, 5333

COLON
- SEE ALSO LARGE INTESTINE
- ANOMALY, CONGENITAL
    - CHOLECYSTITIS, 5306
    - SURGERY, 5324
- DIVERTICULUM
    - BLEEDING, 5290*
- ENDOSCOPY
    - TECHNIQUES, 5148
- FISTULA, 5232, 5484
- NEOPLASMS, MALIGNANT, 5288*
    - BIOPSY, 5317
    - ETIOLOGY, 5318
    - THERAPY, 5308
    - ULCERATIVE COLITIS, 5331
- OBSTRUCTION
    - FOREIGN BODIES, 5287*
- PANCREAS
    - PSEUDOCYST, 5346
- PERFORATION
    - ILEUS, 5265*
- POLYPS, 5295
    - EOSINOPHILS, 5322
    - OBSTRUCTION, 5322
- SURGERY
    - INFECTION, BACTERIA, 5304
- VOLVULUS
    - SURGERY, 5298

COMPLICATIONS
- ABDOMEN
    - SURGERY, 5463
- BILE DUCT
    - HYPERPLASIA, 5439*
- CIRRHOSIS
    - HEPARIN, 5431*
    - LIVER COMA, 5429*
    - SURGERY, 5434
- DUODENUM
    - ULCER, 5225
- LAPAROSCOPY
    - GASTROINTESTINAL, 5461
- MECKELS DIVERTICULUM
    - FOREIGN BODIES, 5245
- PSEUDOCYST
    - SURGERY, 5339
- REGIONAL ENTERITIS
    - ILEUM, 5521*
- SHIGELLOSIS
    - DYSENTERY, 5455*
- SMALL INTESTINE
    - NEOPLASMS, MALIGNANT, 5240*
- STOMACH
    - ULCER, 5232

COMPUTERS
- JAUNDICE
    - DIAGNOSIS, 5169

CONGENITAL
- PYLORUS
    - STENOSIS, 5196
- SMALL INTESTINE
    - ATRESIA, 5246

CONSTIPATION
- ETIOLOGY, 5467
- THERAPY, 5467

CONSTITUTIONAL FACTORS
- STOMACH
    - SECRETION, 5022*

CONTRAST MEDIA
- BILE
    - EXCRETION, 4993
    - SECRETION, 5062*
- GALLBLADDER
    - RADIOLOGY, 5165
- LARGE INTESTINE
    - RADIOLOGY, 5146
- LIVER
    - NEOPLASMS, MALIGNANT, 5365*
- STOMACH
    - RADIOLOGY, 5159

CORTICOSTEROIDS
- SMALL INTESTINE
    - DISACCHARIDASE, 5096*

CROHNS DISEASE
- ABDOMEN
    - LYMPHATICS, 5526
- DIAGNOSIS, 5330
- REVIEWS, 5329

CYCLIC ADENOSINE MONOPHOSPHATE
- PANCREAS
    - SECRETION, 5046*
- STOMACH, 5033
    - ACID SECRETION, 5020*
    - CARBONIC ANHYDRASE, 5020*
    - FEEDING, 5033
    - PENTAGASTRIN, 5033

CYSTIC FIBROSIS
- PANCREAS
    - LIPIDS, 5343

CYSTS
- ESOPHAGITIS, 5188

CYTOLOGY
- PANCREAS
    - ZYMOGENS, 4963
- SALIVARY GLANDS
    - NEOPLASMS, MALIGNANT, 5482

CYTOLOGY, EXFOLIATIVE
- PANCREAS
    - NEOPLASMS, 5140
- STOMACH
    - NEOPLASMS, 5140

NUMBERS FOLLOWED BY AN ASTERISK INDICATE ABSTRACTS. OTHER NUMBERS REFER TO CITATIONS.

ATH
  SEE SURVIVAL

FECATION
  REVIEWS, 5299

FICIENCY
  CHOLINE
    DRUG METABOLISM, 5059*
  GLUCOSE-6-PHOSPHATE DEHYDROGENASE
    JAUNDICE, 5381*
  IMMUNOGLOBULIN
    JEJUNUM, 5237*
  IMMUNOGLOBULINS
    WHIPPLES DISEASE, 5279
  IMMUNOLOGY
    HEPATITIS, 5115
  PHOSPHORYLASE
    DIAGNOSIS, 5364*
    LIVER, 5364*

BETES
  LIVER
    ENZYMES, 5367*
    ULTRASTRUCTURE, 5432

GNOSIS
  AMEBIASIS
    TECHNIQUES, 5164
  CHOLELITIASIS, 5122*
  CROHNS DISEASE, 5330
  DUODENUM
    REGIONAL ENTERITIS, 5525
  ESOPHAGUS
    PERFORATION, 5181*
  FECES
    PROTOZOA, 5153
  HEPATITIS, CHRONIC
    REVIEWS, 5418
  HEPATITIS, VIRAL
    ANTIGEN, AUSTRALIA, 5171
  IRRITABLE COLON
    DIARRHEA, 5291*
  JAUNDICE
    COMPUTERS, 5169
    DRUG-INDUCED, 5169
  LACTOSE INTOLERANCE
    TECHNIQUES, 5174
  LARGE INTESTINE
    ISCHEMIA, 5250
  LIVER
    METASTASES, 5144
  LIVER DISEASE
    CLOTTING, 5132*
    LAPAROSCOPY, 5156
  MALABSORPTION, 5275
  PANCREAS
    TRAUMA, 5350
  PANCREATITIS, 5172
  PHOSPHORYLASE
    DEFICIENCY, 5364*
  PYLORUS
    REGIONAL ENTERITIS, 5525
  SALIVARY GLANDS
    NEOPLASMS, MALIGNANT, 5157
  SMALL INTESTINE
    ISCHEMIA, 5250
  TOXOPLASMOSIS
    IMMUNOLOGY, 5170
  TRYPANOSOMIASIS
    IMMUNOGLOBULINS, 5496*
    IMMUNOLOGY, 5170
  ULCERATIVE COLITIS, 5330

DIALYSIS
  HEPATITIS, SERUM
    PREVENTION, 5391*
  PERITONEUM
    LIVER COMA, 5373

DIARRHEA
  ALKALOSIS
    ANOMALY, CONGENITAL, 5453*
  ESCHERICHIA COLI
    REVIEWS, 5470
  ETIOLOGY
    LACTASE DEFICIENCY, 5277
  IRRITABLE COLON
    DIAGNOSIS, 5291*
  PANCREAS
    HYPERPLASIA, 5345
  SUGAR
    MALABSORPTION, 5282
  THERAPY
    CHILDREN, 5478
  VITAMIN B12
    ABSORPTION, 5270*

DIET
  LIVER DISEASE
    THERAPY, 5379

DIETARY FACTORS
  BILE ACIDS
    EXCRETION, 5109*
  CHOLESTEROL
    METABOLISM, 5109*
  FIBER
    MOTILITY, 5006*
  IRON
    ABSORPTION, 4995
  LACTOSE INTOLERANCE
    REVIEWS, 5283
  LIVER
    GLUCOSE-6-PHOSPHATE DEHYDROGENASE,
      5092
    PHOSPHOLIPID, 5059*
  SMALL INTESTINE
    LACTASE, 5095*
  TOXICITY
    CELIAC DISEASE, 5274*

DIGESTION
  PROTEIN
    STOMACH, 5440

DILATATION
  BILE DUCT
    ANOMALY, CONGENITAL, 5437*
    SURGERY, 5437*
  JEJUNUM
    MUSCULOSKELETAL SYSTEM, 5248
    NEONATE, 5248

DISACCHARIDASE
  SEE ALSO LACTASE
  SMALL INTESTINE
    AGE FACTORS, 5096*

    - CORTICOSTEROIDS, 5096*

- DISACHARIDASE
  - SMALL INTESTINE
    - AGE FACTORS, 5095*

- DISEASES
  - ESOPHAGUS
    - SCANNING, SCINTILLATION, 5126*
  - GALLBLADDER
    - SCANNING, SCINTILLATION, 5128*
  - INTESTINE
    - CHEMOTHERAPY, 5264
    - MICROORGANISMS, 5264
  - PYLORUS, 5208

- DISEASES ASSOCIATED WITH
  - ABDOMEN, ACUTE
    - SURGERY, 5471
  - AMEBIASIS
    - DRUG TREATMENT, 5502
  - BLIND LOOP SYNDROME, 5469
  - DYSENTERY
    - ULCERATIVE COLITIS, 5327
  - HEPATOMEGALY, 5371
  - ILEUM
    - ULCER, 5469
  - INTESTINE
    - DIVERTICULUM, 5469
  - LIVER
    - ABSCESS, 5491*
    - FIBROSIS, 5380
  - LIVER DISEASE
    - KIDNEY, 5368*
  - MALABSORPTION, 5271*
  - MALNUTRITION
    - MALABSORPTION, 5269*
  - MENETRIERES DISEASE
    - PROTEIN-LOSING ENTEROPATHY, 5278
  - PANCREAS
    - LIPIDS, 5348
  - SALIVARY GLANDS
    - NEOPLASMS, 5472
  - SIGMOID
    - VOLVULUS, 5284*

- DIVERTICULUM
  - COLON
    - BLEEDING, 5290*
  - ESOPHAGUS
    - INFECTIONS, FUNGUS, 5183
  - INTESTINE
    - DISEASES ASSOCIATED WITH, 5469
  - LARGE INTESTINE
    - BLEEDING, 5296

- DRUG ADDICTION
  - HEPATITIS, VIRAL
    - IMMUNOLOGY, 5395*
    - LIVER FUNCTION TESTS, 5395*

- DRUG EFFECTS ON
  - ANTIBACTERIALS
    - ABSORPTION, 4996
  - APPENDIX, 5292
  - CALCIUM
    - ABSORPTION, 4990*
  - ESOPHAGUS
    - PERISTALSIS, 5012
  - LIVER
    - MITOSIS, 5089
  - SMALL INTESTINE
    - ANASTOMOSIS, 5244
    - LIPIDS, 5093*
    - MOTILITY, 5004*, 5009
    - PROTEIN, 5093*
    - RADIATION, 5104
    - TRANSPLANTATION, 5247
  - STOMACH
    - ACID SECRETION, 5023*
    - MOTILITY, 5009
    - ULCER, 5221

- DRUG-INDUCED
  - HEPATITIS, CHRONIC
    - LAXATIVES, 5416
  - JAUNDICE
    - ANESTHETICS, 5381*
    - ANTINEOPLASTIC AGENTS, 5387
    - DIAGNOSIS, 5169
  - LIVER
    - NECROSIS, 5385*
  - ULCERATIVE COLITIS
    - SIMULATION, 5334

- DRUG METABOLISM
  - ANTISPASMODICS
    - TRACER STUDY, 4998
  - CHOLINE
    - DEFICIENCY, 5059*
  - GASTROINTESTINAL, 5107
  - LIVER
    - NAPHTHYLISOTHIOCYANATE, ALPHA, 5081*
    - NARCOTICS, 5087

- DRUG TREATMENT
  - AMEBIASIS, 5495*
    - DISEASES ASSOCIATED WITH, 5502
    - LIVER, 5504
  - APPENDECTOMY
    - ABSCESS, 5325
  - DUODENUM
    - ULCER, 5218, 5233
  - GASTROINTESTINAL
    - INFECTION, FUNGUS, 5464
  - HEARTBURN, 5209
  - INTESTINE
    - AMEBIASIS, 5500
  - LARGE INTESTINE
    - ADHESIONS, 5320
  - LIVER
    - AMEBIASIS, 5497
    - METASTASES, 5288*
  - LIVER DISEASE
    - VITAMIN E, 5388
  - LIVER INJURY, 5058*
  - PEPTIC ULCER, 5023*
    - GLUCOSE, 5024*
  - REGIONAL ENTERITIS
    - TECHNIQUES, 5524

- DUODENUM
  - SEE ALSO SMALL INTESTINE
  - CHYMOTRYPSIN
    - HORMONE EFFECTS ON, 5052
  - ENDOSCOPY, 5259
  - FISTULA, 5225, 5484

NUMBERS FOLLOWED BY AN ASTERISK INDICATE ABSTRACTS. OTHER NUMBERS REFER TO CITATIONS.

- MOTILITY
  - ACID SECRETION, 5034
  - TRANQUILIZERS, 5008
- MUCOSA
  - GLYCOPROTEINS, 4970
  - RADIOLOGY, 5256
- NEOPLASMS, MALIGNANT
  - ENDOSCOPY, 5204
  - SURGERY, 5258
- NUCLEIC ACIDS
  - ANTRECTOMY, 4949*
  - GASTRIN, 4949*
- OBSTRUCTION
  - HODGKINS DISEASE, 5263
- PANCREAS
  - PSEUDOCYST, 5346
- RADIOLOGY, 5167
- REGIONAL ENTERITIS
  - DIAGNOSIS, 5525
  - REVIEWS, 5522
  - SURGERY, 5520*
- TRAUMA
  - REVIEWS, 5349
- TRYPSIN
  - HORMONE EFFECTS ON, 5052
- ULCER, 5216*
  - COMPLICATIONS, 5225
  - DRUG TREATMENT, 5218, 5233
  - PATHOLOGY, 5217*
  - VAGOTOMY, 5194*

DENUM ULCER
- SEE ALSO PEPTIC ULCER

DEUNUM
- NEOPLASMS
  - BLEEDING, 5249

ENTERY
- DISEASES ASSOCIATED WITH
  - ULCERATIVE COLITIS, 5327
- SHIGELLOSIS
  - COMPLICATIONS, 5455*

OLI
- INTESTINE
  - STRANGULATION, 5242*
- TOXIN
  - INHIBITION, 5483

CTROLYTE
- ABSORPTION
  - INTESTINE, 4992
  - JEJUNUM, 4982*
  - PROSTAGLANDIN, 4982*
- BILE
  - CALCIUM, 5070
- LIVER
  - PERFUSION, 5083*
- TRANSPORT
  - LIVER, 4976*
  - SHOCK, 4976*

TROPHYSIOLOGY
- GALLBLADDER
  - ION TRANSPORT, 4994
- STOMACH
  - HORMONE EFFECTS ON, 5029*

EMESIS
- SEE VOMITING

ENDOMETRIOSIS
- ILEUM, 5260

ENDOSCOPY
- BILE DUCT, 5138
- BILIARY TRACT
  - TECHNIQUES, 5148
- COLON
  - TECHNIQUES, 5148
- DUODENUM, 5259
  - NEOPLASMS, MALIGNANT, 5204
- ESOPHAGUS
  - TELANGIECTASIA, 5197
- GASTROINTESTINAL
  - TECHNIQUES, 5176
- HIATUS HERNIA, 5178*
- PANCREATIC DUCT, 5138
  - TECHNIQUES, 5148
- PEPTIC ULCER
  - ASPIRIN, 5229
- STOMACH, 5127*, 5259
  - FOREIGN BODIES, 5198
  - NEOPLASMS, MALIGNANT, 5129*
  - TELANGIECTASIA, 5197
  - ULCER, 5129*

ENTERECTOMY
- SMALL INTESTINE
  - ION TRANSPORT, 5000

ENTERITIS
- SEE ALSO REGIONAL ENTERITIS
- INFECTION, BACTERIA
  - TRANSMISSION, 5456*

ENTEROCOLITIS
- NEONATE, 5302

ENZYMES
- LIVER
  - ALCOHOL, 5073*
  - ANTIBACTERIALS, 4969
  - ANTIBIOTICS, 4969
  - CARBON TETRACHLORIDE, 5449
  - DIABETES, 5367*
  - MORPHOLOGY, 4952
- NARCOTICS
  - METABOLISM, 5087

EOSINOPHILS
- COLON
  - POLYPS, 5322
- INFILTRATION
  - GASTROENTERITIS, 5486, 5487
- SMALL INTESTINE
  - INFILTRATION, 5262

EPIDEMIOLOGY
- ANTIGEN, AUSTRALIA
  - LIVER DISEASE, 5414
- INTESTINE
  - PARASITES AND PARASITIC DISEASE, 5513
- MALABSORPTION, 5269*
- MALNUTRITION, 5269*
- PARASITES AND PARASITIC DISEASE, 5498,

  - 5499
    - ETHNIC FACTORS, 5510, 5515
  - SCHISTOSOMIASIS, 5514
  - STOMACH
    - NEOPLASMS, MALIGNANT, 5191*

ESCHERICHIA COLI
- DIARRHEA
  - REVIEWS, 5470

ESOPHAGITIS
- CYSTS, 5188
- SURGERY, 5189

ESOPHAGUS
- ATRESIA
  - SURGERY, 5182
- DISEASES
  - SCANNING, SCINTILLATION, 5126*
- INFECTIONS, FUNGUS
  - DIVERTICULUM, 5183
- MORPHOLOGY
  - MUCUS, 5180*
- MOTILITY
  - NERVOUS CONTROL, 5001*
- NEOPLASMS, MALIGNANT
  - CALCIUM, 5179*
  - INTUBATION, 5185, 5187
  - RADIOTHERAPY, 5184
  - SCLERODERMA, 5190
  - SURGERY, 5184, 5187
- OBSTRUCTION
  - INTUBATION, 5186
- PERFORATION
  - DIAGNOSIS, 5181*
  - ETIOLOGY, 5181*
  - THERAPY, 5181*
- PERISTALSIS
  - DRUG EFFECTS ON, 5012
  - NERVOUS CONTROL, 5012
- SPHINCTER
  - NERVOUS CONTROL, 5001*
- TELANGIECTASIA
  - ENDOSCOPY, 5197

ESTROGENS
- BINDING
  - PANCREAS, 5053

ETHIONINE
- CHOLESTEROL
  - SYNTHESIS, 5067*
- LIVER
  - MORPHOLOGY, 4971

ETHNIC FACTORS
- LACTOSE INTOLERANCE
  - REVIEWS, 5283
- PARASITES AND PARASITIC DISEASE
  - EPIDEMIOLOGY, 5510, 5515

ETIOLOGY
- ASCARIASIS
  - LIVER, 5507
- CHOLECYSTITIS, 5435*
  - SALMONELLOSIS, 5452
- CHOLESTASIS
  - SYPHILIS, 5384
- COLON
  - NEOPLASMS, MALIGNANT, 5318
- CONSTIPATION, 5467
- DIARRHEA
  - LACTASE DEFICIENCY, 5277
- ESOPHAGUS
  - PERFORATION, 5181*
- FATTY LIVER, 5073*
- HEARTBURN, 5209
- HEPATITIS, VIRAL, 5389*
- PANCREAS
  - PSEUDOCYST, 5336*
- PANCREATITIS
  - FAMILIAL FACTORS, 5354*
- PEPTIC ULCER, 5231
  - NEOPLASMS, 5235
- RECTUM
  - NEOPLASMS, MALIGNANT, 5318
- REYES SYNDROME
  - INFECTION, VIRUS, 5366*
- SCHISTOSOMIASIS
  - CHILDREN, 5501
- STOMACH
  - ULCER, 5227
- ULCERATIVE COLITIS, 5328
- WHIPPLES DISEASE
  - BACTERIA, 5280

EXCRETION
- BILE
  - CONTRAST MEDIA, 4993
  - PHENOBARBITAL, 4993
- BILE ACIDS
  - CARBOHYDRATE, 5109*
  - DIETARY FACTORS, 5109*
- LIVER
  - ANTICONVULSANTS, 5051
- PANCREAS
  - ANTICONVULSANTS, 5051

FAMILIAL FACTORS
- PANCREATITIS
  - ETIOLOGY, 5354*

FATS
- SEE LIPIDS, TRIGLYCERIDES

FATTY ACIDS
- ABSORPTION
  - INTESTINE, 4988*
  - JEJUNUM, 4977*
  - PHYSICAL FACTORS, 4977*
- SECRETION
  - INTESTINE, 4988*
- STOMACH
  - ACID SECRETION, 5019*
- SYNTHESIS
  - CITRIC ACID, 5072*
  - COENZYMES, 5072*
  - LIVER, 5072*

FATTY LIVER
- ALCOHOL
  - SIMULATION, 5066*
- ETIOLOGY, 5073*

FECES, 5488
- PROTOZOA
  - DIAGNOSIS, 5153
  - TECHNIQUES, 5153

EEDING
- STOMACH
  - CYCLIC ADENOSINE MONOPHOSPHATE, 5033
  - MOTILITY, 5010

ETOPROTEIN, ALPHA
- HEPATITIS, VIRAL, 5392*, 5402*
- LIVER
  - NEOPLASMS, MALIGNANT, 5402*

IBER
- DIETARY FACTORS
  - MOTILITY, 5006*
- INTESTINE
  - MOTILITY, 5006*

IBRINOLYSIS
- LIVER DISEASE, 5403*

IBROSIS
- LIVER
  - DISEASES ASSOCIATED WITH, 5380
  - GLYCOPROTEINS, 5494*
  - LIVER DISEASE, ALCOHOLIC, 5425
  - SCHISTOSOMIASIS, 5494*
- PERITONEUM
  - LISTERIOSIS, 5477
- SCHISTOSOMIASIS
  - LIVER, 5506

ISTULA
- ANORECTUM
  - SURGERY, 5309
- BILIARY TRACT, 5225
- COLON, 5232, 5484
- DUODENUM, 5225, 5484
- INTESTINE
  - THERAPY, 5314
- STOMACH, 5232
  - RADIOLOGY, 5201

OD POISONING
- STAPHYLOCOCCUS, 5465

REIGN BODIES
- ANORECTUM, 5297
- COLON
  - OBSTRUCTION, 5287*
- MECKELS DIVERTICULUM
  - COMPLICATIONS, 5245
- STOMACH, 5224
  - ENDOSCOPY, 5198

LACTOSAMINE
- HEPATITIS, NONVIRAL
  - GLUCONEOGENESIS, 5069*
- LIVER INJURY
  - ULTRASTRUCTURE, 5071*
- NUCLEIC ACIDS
  - SYNTHESIS, 5071*
- PROTEIN
  - SYNTHESIS, 5071*

LACTOSE
- LIVER
  - ABSORPTION, 4985*

LLBLADDER
- DISEASES
  - SCANNING, SCINTILLATION, 5128*
- ION TRANSPORT
  - ELECTROPHYSIOLOGY, 4994
- MOTILITY
  - NERVOUS CONTROL, 4964
- NEOPLASMS, MALIGNANT
  - CALCIFICATION, 5443
- RADIOLOGY
  - CONTRAST MEDIA, 5165
  - TECHNIQUES, 5165
- TORSION
  - AGE FACTORS, 5444

GANGLIOSIDES
- CHOLERA
  - TOXIN, 5111

GASTRECTOMY
- SEE ALSO ANTRECTOMY
- PEPTIC ULCER, 5234

GASTRIN
- DUODENUM
  - NUCLEIC ACIDS, 4949*
- HYDROLYSIS
  - LIVER, 5113
  - SERUM, 5113
- METABOLISM
  - KIDNEY, 5027*
- PEPTIC ULCER
  - VAGOTOMY, 5194*
- STOMACH
  - NUCLEIC ACIDS, 4949*

GASTRITIS
- STOMACH
  - ACID SECRETION, 5195*
  - PEPSIN, 5195*

GASTRITIS, ATROPHIC
- ACID SECRETION, 5158
- MORPHOLOGY, 5158
- RADIOLOGY, 5158

GASTRITIS, REFLUX
- STOMACH
  - SURGERY, 5212

GASTRODUODENAL
- BLEEDING
  - SURGERY, 5203

GASTROENTERITIS
- EOSINOPHILS
  - INFILTRATION, 5486, 5487
- INFECTION, BACTERIA
  - TRANSMISSION, 5466
- ISCHEMIA
  - NEONATE, 5481
- SIMULATION, 5238*
- SMALL INTESTINE
  - MUCOSA, 5238*

GASTROINTESTINAL
- ABSORPTION
  - MAGNESIUM, 5103
- ANOMALY, CONGENITAL
  - SURGERY, 5468

- BLEEDING
  - ANGIOGRAPHY, 5142, 5168
- DRUG METABOLISM, 5107
- ENDOSCOPY
  - TECHNIQUES, 5176
- HORMONE
  - METABOLISM, 5107
- INFECTION
  - IMMUNOGLOBULINS, 5166
- INFECTION, FUNGUS
  - DRUG TREATMENT, 5464
- ION TRANSPORT
  - TRACER STUDY, 4997
- LAPAROSCOPY
  - COMPLICATIONS, 5461
- MOTILITY
  - PARATHYROID GLAND, 5007*
  - THYROID, 5007*
- NEOPLASMS
  - ANGIOGRAPHY, 5139
- PERFORATION
  - SEPSIS, 5463
- SECRETION
  - PHYSICAL ACTIVITY, 5013*
- TUBERCULOSIS, 5462

GASTROINTESTINAL TRACT
- MORPHOLOGY
  - NERVOUS SYSTEM, 4956
  - POSTURAL FACTORS, 4955
- MOTILITY
  - HORMONE EFFECTS ON, 5003*
- PROSTAGLANDIN, 5112

GENETIC FACTORS
- STOMACH
  - ACID SECRETION, 5041
  - NEOPLASMS, MALIGNANT, 5192*

GLUCAGON
- INTESTINE
  - INSULIN, 5098*

GLUCONEOGENESIS
- HEPATITIS, NONVIRAL
  - GALACTOSAMINE, 5069*
- JAUNDICE, OBSTRUCTIVE, 5069*
- LIVER
  - STEROID, 5090

GLUCOSE
- ABSORPTION
  - BILE ACIDS, 4966*
  - JEJUNUM, 4982*, 4986*
  - PROSTAGLANDIN, 4982*
  - SMALL INTESTINE, 4981*
- LARGE INTESTINE
  - METABOLISM, 4973
  - ULTRASTRUCTURE, 4973
- PEPTIC ULCER
  - DRUG TREATMENT, 5024*
- STOMACH
  - ACID SECRETION, 5024*

GLUCOSE INTOLERANCE
- SCHISTOSOMIASIS
  - LIVER, 5506

GLUCOSE-6-PHOSPHATE DEHYDROGENASE
- DEFICIENCY
  - JAUNDICE, 5381*
- LIVER
  - AGE FACTORS, 5092
  - DIETARY FACTORS, 5092

GLUTAMYL TRANSPEPTIDASE, GAMMA
- BLOOD
  - METASTASES, 5144

GLYCOGEN
- SYNTHESIS
  - STEROID, 5090

GLYCOPROTEINS
- DUODENUM
  - MUCOSA, 4970
- LIVER
  - FIBROSIS, 5494*
- MUCUS
  - ULCERATIVE COLITIS, 5332

HEALING
- LIVER
  - TEMPERATURE, 4958

HEARTBURN
- DRUG TREATMENT, 5209
- ETIOLOGY, 5209

HELMINTHIASIS
- CHEMOTHERAPY, 5516
- LIVER
  - METABOLISM, 5518
  - SIMULATION, 5518

HEMORRHAGE
- SEE BLEEDING

HEMORRHOIDS
- SURGERY
  - TECHNIQUES, 5303

HEPARIN
- CIRRHOSIS
  - COMPLICATIONS, 5431*

HEPATECTOMY
- LIVER
  - REGENERATION, 5056*, 5064*

HEPATITIS
- IMMUNOLOGY
  - DEFICIENCY, 5115

HEPATITIS, CHRONIC
- ANTIGEN, AUSTRALIA, 5422
- AUTOIMMUNITY, 5376
- CHILDREN
  - REVIEWS, 5417
- DIAGNOSIS
  - REVIEWS, 5418
- DRUG-INDUCED
  - LAXATIVES, 5416
- IMMUNOLOGY, 5413*
  - REVIEWS, 5420
- LIVER
  - ANTIGEN, AUSTRALIA, 5394*
  - IMMUNOGLOBULINS, 5413*

- ULTRASTRUCTURE, 5394*
- LIVER FUNCTION TESTS, 5133*
- MORPHOLOGY
  - REVIEWS, 5415
- REVIEWS, 5419, 5421

EPATITIS, NONVIRAL
- GALACTOSAMINE
  - GLUCONEOGENESIS, 5069*
- RADIATION
  - MORPHOLOGY, 5386*

EPATITIS, SERUM
- PREVENTION
  - DIALYSIS, 5391*
- TRANSMISSION, 5407, 5409

EPATITIS, VIRAL
- ANTIGEN, AUSTRALIA, 5402*
- CLOTTING, 5133*
- DIAGNOSIS
  - ANTIGEN, AUSTRALIA, 5171
- ETIOLOGY, 5389*
- FETOPROTEIN, ALPHA, 5392*, 5402*
- IMMUNOLOGY, 5398*
  - DRUG ADDICTION, 5395*
- LIVER
  - MORPHOLOGY, 5400*
- LIVER FUNCTION TESTS, 5410
  - DRUG ADDICTION, 5395*
- PROGNOSIS
  - CERULOPLASMIN, 5124*
- REVIEWS, 5411
- SEQUELAE
  - PROTEIN-LOSING ENTEROPATHY, 5278
- TISSUE CULTURE
  - STEROIDS, 5390*
- TRANSMISSION, 5396*, 5398*
  - TRANSFUSION, 5405*

EPATOMEGALY
- DISEASES ASSOCIATED WITH, 5371

ETEROTOPIA
- PANCREAS
  - STOMACH, 5342

IATUS HERNIA
- ENDOSCOPY, 5178*
- SURGERY, 5182, 5189

RSCHSPRUNGS DISEASE
- PATHOLOGY
  - NERVOUS SYSTEM, 5286*
- SURGERY
  - CHILDREN, 5312
  - TECHNIQUES, 5310

STAMINE
- METABOLISM
  - CARBON TETRACHLORIDE, 5410
- STOMACH
  - ACID SECRETION, 5015*, 5016*
  - ADENYL CYCLASE, 5039
  - SECRETION, 5038

DGKINS DISEASE
- DUODENUM
  - OBSTRUCTION, 5263

HORMONE
- METABOLISM
  - GASTROINTESTINAL, 5107
  - LIVER, 5447

HORMONE CONTROL
- PYLORUS
  - SPHINCTER, 5005*
- STOMACH
  - ACID SECRETION, 5041

HORMONE EFFECTS ON
- DUODENUM
  - CHYMOTRYPSIN, 5052
  - TRYPSIN, 5052
- GASTROINTESTINAL TRACT
  - MOTILITY, 5003*
- LARGE INTESTINE
  - ION TRANSPORT, 4991
- LIVER
  - MORPHOLOGY, 4965
- PANCREAS
  - AMINO ACIDS, 5047*
- STOMACH
  - ACID SECRETION, 5016*, 5029*
  - ELECTROPHYSIOLOGY, 5029*
  - MOTILITY, 5035
  - NEOPLASMS, MALIGNANT, 5206
  - SECRETION, 5035
- VITAMIN C
  - ABSORPTION, 4979*

HYDROCARBONS, HALOGENATED
- LIVER
  - MORPHOLOGY, 5057*
  - ULTRASTRUCTURE, 5057*

HYDROLYSIS
- GASTRIN
  - LIVER, 5113
  - SERUM, 5113

HYPERBILIRUBINEMIA
- ALBUMIN
  - METABOLISM, 5079*
- LACTATE DEHYDROGENASE
  - ISOENZYMES, 5382
- PREMATURITY
  - PHOTOTHERAPY, 5383

HYPERCALCEMIA
- LIVER
  - NEOPLASMS, MALIGNANT, 5365*
- PANCREAS
  - SECRETION, 5044*

HYPERCHLORHYDRIA
- SEE ALSO ACID SECRETION

HYPERPLASIA
- PANCREAS
  - DIARRHEA, 5345

HYPOCHLORHYDRIA
- SEE ALSO ACID SECRETION

HYPOGLYCEMIA
- LIVER
  - NEOPLASMS, MALIGNANT, 5375

HYPOPLASIA
- BILE DUCT
  - COMPLICATIONS, 5439*

HYPOTHERMIA
- LIVER
  - ULTRASTRUCTURE, 4974

ICTERUS
- SEE JAUNDICE

ILEOSTOMY
- PSYCHOLOGICAL FACTORS
  - THERAPY, 5267

ILEUM
- SEE ALSO SMALL INTESTINE
- ANOMALY, 5315
- ENDOMETRIOSIS, 5260
- ION TRANSPORT
  - CHOLERA, 4978*
- KINETICS, CELL
  - IRRADIATION, 4950*
- NEOPLASMS, MALIGNANT
  - BLEEDING, 5257
  - RADIOLOGY, 5239*
- RADIOLOGY
  - COLITIS, GRANULOMATOUS, 5333
- REGIONAL ENTERITIS
  - COMPLICATIONS, 5521*
- TUBERCULOSIS
  - REGIONAL ENTERITIS, 5519*
- ULCER
  - DISEASES ASSOCIATED WITH, 5469
- VOLVULUS
  - MORPHOLOGY, 5323
  - SURGERY, 5323

ILEUS
- COLON
  - PERFORATION, 5285*

IMMUNOGLOBULIN
- DEFICIENCY
  - JEJUNUM, 5237*

IMMUNOGLOBULINS
- DEFICIENCY
  - WHIPPLES DISEASE, 5279
- GASTROINTESTINAL
  - INFECTION, 5166
- LIVER
  - HEPATITIS, CHRONIC, 5413*
- SMALL INTESTINE, 5097*
  - MORPHOLOGY, 5271*
- TRYPANOSOMIASIS
  - DIAGNOSIS, 5496*

IMMUNOLOGY
- BILIARY TRACT
  - OBSTRUCTION, 5426*
- CIRRHOSIS
  - BACTERIA, 5428*
- CIRRHOSIS, BILIARY, 5426*
- DEFICIENCY
  - HEPATITIS, 5115
- HEPATITIS, CHRONIC, 5413*
  - REVIEWS, 5420
- HEPATITIS, VIRAL, 5398*
  - DRUG ADDICTION, 5395*
- INTESTINE, 5098*
  - PARASITES AND PARASITIC DISEASE, 5511
- LARGE INTESTINE
  - NEOPLASMS, MALIGNANT, 5305
- LIVER DISEASE, 5426*
- PARASITES AND PARASITIC DISEASE
  - LIVER, 5517
- SCHISTOSOMIASIS
  - SIMULATION, 5492*, 5493*
- TOXOPLASMOSIS
  - DIAGNOSIS, 5170
- TRYPANOSOMIASIS, 5512
  - DIAGNOSIS, 5170

IMMUNOTHERAPY
- LIVER
  - NEOPLASMS, MALIGNANT, 5374

INFECTION
- GASTROINTESTINAL
  - IMMUNOGLOBULINS, 5166

INFECTION, BACTERIA
- COLON
  - SURGERY, 5304
- PERITONITIS
  - CHILDREN, 5457
- RECTUM
  - SURGERY, 5304
- TRANSMISSION
  - ENTERITIS, 5456*
  - GASTROENTERITIS, 5466

INFECTION, FUNGUS
- GASTROINTESTINAL
  - DRUG TREATMENT, 5464

INFECTION, VIRUS
- REYES SYNDROME
  - ETIOLOGY, 5366*

INFECTIONS, FUNGUS
- ESOPHAGUS
  - DIVERTICULUM, 5183

INFILTRATION
- EOSINOPHILS
  - GASTROENTERITIS, 5486, 5487
- SMALL INTESTINE
  - EOSINOPHILS, 5262

INFLAMMATION
- MESENTERY
  - SMALL INTESTINE, 5454*

INHIBITION
- CHOLERA
  - TOXIN, 5483
- E.COLI
  - TOXIN, 5483
- STOMACH
  - ACID SECRETION, 5017*

INSULIN
- INTESTINE
  - GLUCAGON, 5098*
- STOMACH

- ACID SECRETION, 5028*

TESTINE
- SEE ALSO SMALL INTESTINE
- ABSORPTION
  - PHOSPHATE, 4989*
  - SHOCK, 4999
- ADHESIONS, 5254
  - CHILDREN, 5254
- AMEBIASIS
  - DRUG TREATMENT, 5500
- BILE ACIDS
  - ABSORPTION, 4988*
  - SECRETION, 4988*
- CALCIUM
  - ABSORPTION, 4990*
- DISEASES
  - CHEMOTHERAPY, 5264
  - MICROORGANISMS, 5264
- DIVERTICULUM
  - DISEASES ASSOCIATED WITH, 5469
- ELECTROLYTE
  - ABSORPTION, 4992
- FATTY ACIDS
  - ABSORPTION, 4988*
  - SECRETION, 4988*
- FISTULA
  - THERAPY, 5314
- GLUCAGON
  - INSULIN, 5098*
- IMMUNOLOGY, 5098*
- LIPOLYSIS, 5098*
- MOTILITY
  - FIBER, 5006*
- PARASITES AND PARASITIC DISEASE, 5511
  - EPIDEMIOLOGY, 5513
  - IMMUNOLOGY, 5511
- RADIATION
  - RADIOPROTECTIVE AGENTS, 5102
- STRANGULATION
  - E.COLI, 5242*
- SUGAR
  - ABSORPTION, 4992

TUBATION
- ESOPHAGUS
  - NEOPLASMS, MALIGNANT, 5185, 5187
  - OBSTRUCTION, 5186

DINE
- LIVER
  - CHEMICAL COMPOSITION, 5447

N TRANSPORT
- ADENOSINE TRIPHOSPHATASE, 5116
- GALLBLADDER
  - ELECTROPHYSIOLOGY, 4994
- GASTROINTESTINAL
  - TRACER STUDY, 4997
- ILEUM
  - CHOLERA, 4978*
- LARGE INTESTINE
  - HORMONE EFFECTS ON, 4991
- LIVER
  - TRACER STUDY, 4984*
- SMALL INTESTINE
  - ENTERECTOMY, 5000

ON
- ABSORPTION
  - DIETARY FACTORS, 4995
  - PANCREATECTOMY, 4987*
  - SMALL INTESTINE, 4995
- LIVER
  - CIRRHOSIS, 4987*
  - METABOLISM, 5074*
  - PANCREATECTOMY, 4987*
  - ULTRASTRUCTURE, 5074*

IRRADIATION
- BILIRUBIN
  - PHYSICAL PROPERTIES, 5110*
- ILEUM
  - KINETICS, CELL, 4950*
- PEPSIN, 5118
- SMALL INTESTINE
  - NERVOUS CONTROL, 5450
- TRYPSIN, 5117

IRRITABLE COLON
- DIARRHEA
  - DIAGNOSIS, 5291*
- MALABSORPTION
  - LACTOSE, 5291*

ISCHEMIA
- GASTROENTERITIS
  - NEONATE, 5481
- LARGE INTESTINE
  - DIAGNOSIS, 5250
- SMALL INTESTINE
  - DIAGNOSIS, 5250

ISOENZYMES
- BLOOD
  - AMINOPEPTIDASE, 5427*
- LACTATE DEHYDROGENASE
  - HYPERBILIRUBINEMIA, 5382

ISOLATION
- SMALL INTESTINE
  - MUCUS, 4948*

JAUNDICE
- DIAGNOSIS
  - COMPUTERS, 5169
- DRUG-INDUCED
  - ANESTHETICS, 5381*
  - ANTINEOPLASTIC AGENTS, 5387
  - DIAGNOSIS, 5169
- GLUCOSE-6-PHOSPHATE DEHYDROGENASE
  - DEFICIENCY, 5381*
- PREGNANCY, 5480

JAUNDICE, OBSTRUCTIVE
- ARTERY
  - ANEURYSM, 5458
- CHOLESTEROL
  - METABOLISM, 5075*
- GLUCONEOGENESIS, 5069*
- LIVER
  - CHOLESTEROL, 5075*
  - METASTASES, 5377
- NEONATE
  - SURGERY, 5438*

JEJUNUM
- SEE ALSO SMALL INTESTINE

- DILATATION
  - MUSCULOSKELETAL SYSTEM, 5248
  - NEONATE, 5248
- ELECTROLYTE
  - ABSORPTION, 4982*
- FATTY ACIDS
  - ABSORPTION, 4977*
- GLUCOSE
  - ABSORPTION, 4982*, 4986*
- IMMUNOGLOBULIN
  - DEFICIENCY, 5237*
- KINETICS, CELL, 5099*
- NUCLEIC ACIDS
  - SYNTHESIS, 5099*
- SCLERODERMA
  - MORPHOLOGY, 5241*
  - RADIOLOGY, 5241*
- WATER
  - ABSORPTION, 4982*, 4986*

KETOSIS
- LIVER
  - MORPHOLOGY, 4962

KIDNEY
- GASTRIN
  - METABOLISM, 5027*
- LIVER DISEASE
  - DISEASES ASSOCIATED WITH, 5368*

KINETICS, CELL
- ILEUM
  - IRRADIATION, 4950*
- JEJUNUM, 5099*

KWASHIORKOR
- PEPTIC ULCER
  - SURGERY, 5281

LACTASE
- SEE ALSO DISACCHARIDASE
- SMALL INTESTINE
  - DIETARY FACTORS, 5095*

LACTASE DEFICIENCY
- DIARRHEA
  - ETIOLOGY, 5277
- ULCERATIVE COLITIS
  - MALABSORPTION, 5326*

LACTATE DEHYDROGENASE
- ISOENZYMES
  - HYPERBILIRUBINEMIA, 5382

LACTOSE
- MALABSORPTION
  - IRRITABLE COLON, 5291*

LACTOSE INTOLERANCE
- DIAGNOSIS
  - TECHNIQUES, 5174
- DIETARY FACTORS
  - REVIEWS, 5283
- ETHNIC FACTORS
  - REVIEWS, 5283

LAMBLIASIS
- SEE GIARDIASIS

LAPAROSCOPY
- COMPLICATIONS
  - GASTROINTESTINAL, 5461
- LIVER DISEASE
  - DIAGNOSIS, 5156

LARGE INTESTINE
- SEE ALSO INTESTINE, APPENDIX, CECUM, COLON, RECTUM, ANUS, SIGMOID

  , 5237*
- ADHESIONS
  - DRUG TREATMENT, 5320
  - SIMULATION, 5320
- DIVERTICULUM
  - BLEEDING, 5296
- ION TRANSPORT
  - HORMONE EFFECTS ON, 4991
- ISCHEMIA
  - DIAGNOSIS, 5250
- METABOLISM
  - GLUCOSE, 4973
- MICROORGANISMS, 5252
- MOTILITY
  - MEGACOLON, 5002*
- NEOPLASMS, MALIGNANT
  - IMMUNOLOGY, 5305
  - MORPHOLOGY, 5289*
  - RECURRENCE, 5311
  - SURGERY, 5268, 5311
- PIGMENTATION, 5307
- POLYPS
  - SURGERY, 5319
- RADIOLOGY
  - CONTRAST MEDIA, 5146
- ULTRASTRUCTURE
  - GLUCOSE, 4973

LAXATIVES
- HEPATITIS, CHRONIC
  - DRUG-INDUCED, 5416

LIPASE
- PANCREAS
  - SIMULATION, 5043*

LIPIDS
- BLOOD
  - ABDOMEN, ACUTE, 5485
  - CHOLELITHIASIS, 5122*
  - PANCREATITIS, 5485
- LIVER
  - MORPHOLOGY, 4972
- METABOLISM
  - ALCOHOL, 5066*
  - LIVER, 5082*
  - SMALL INTESTINE, 5082*
- PANCREAS
  - CYSTIC FIBROSIS, 5343
  - DISEASES ASSOCIATED WITH, 5348
- PEROXIDATION
  - LIVER, 5078*
- SMALL INTESTINE
  - DRUG EFFECTS ON, 5093*

LIPOLYSIS
- INTESTINE, 5098*

LISTERIOSIS

  - PERITONEUM
    - FIBROSIS, 5477

- IVER
  - ABSCESS
    - AMEBIASIS, 5491*
    - DISEASES ASSOCIATED WITH, 5491*
  - ABSORPTION
    - GALACTOSE, 4985*
  - ADENOSINE TRIPHOSPHATASE
    - ANTINEOPLASTIC AGENTS, 5088
  - ALBUMIN
    - SYNTHESIS, 5085
  - ALKALOIDS
    - METABOLISM, 5084
  - AMEBIASIS
    - ABSCESS, 5505
    - DRUG TREATMENT, 5497, 5504
    - REVIEWS, 5505
    - SURGERY, 5503
  - AMINO ACIDS
    - LIVER INJURY, 5054*
    - METABOLISM, 5094*
  - ANTIGEN, AUSTRALIA
    - HEPATITIS, CHRONIC, 5394*
  - ASCARIASIS
    - ETIOLOGY, 5507
  - BIOPSY
    - TECHNIQUES, 4954
  - BLEEDING
    - PREGNANCY, 5480
  - CARBON TETRACHLORIDE
    - BINDING, 5091
  - CHEMICAL COMPOSITION
    - IODINE, 5447
    - PROTEIN, 5447
  - CHOLESTEROL
    - JAUNDICE, OBSTRUCTIVE, 5075*
  - DRUG METABOLISM
    - NAPHTHYLISOTHIOCYANATE, ALPHA, 5081*
    - NARCOTICS, 5087
  - ELECTROLYTE
    - TRANSPORT, 4976*
  - ENZYMES
    - ALCOHOL, 5073*
    - ANTIBACTERIALS, 4969
    - ANTIBIOTICS, 4969
    - CARBON TETRACHLORIDE, 5449
    - DIABETES, 5367*
  - EXCRETION
    - ANTICONVULSANTS, 5051
  - FATTY ACIDS
    - SYNTHESIS, 5072*
  - FIBROSIS
    - DISEASES ASSOCIATED WITH, 5380
    - GLYCOPROTEINS, 5494*
    - LIVER DISEASE, ALCOHOLIC, 5425
    - SCHISTOSOMIASIS, 5494*
  - GASTRIN
    - HYDROLYSIS, 5113
  - GLUCONEOGENESIS
    - STEROID, 5090
  - GLUCOSE-6-PHOSPHATE DEHYDROGENASE
    - AGE FACTORS, 5092
    - DIETARY FACTORS, 5092
  - HEALING
    - TEMPERATURE, 4958
  - HELMINTHIASIS
    - METABOLISM, 5518
    - SIMULATION, 5518
  - HORMONE
    - METABOLISM, 5447
  - IMMUNOGLOBULINS
    - HEPATITIS, CHRONIC, 5413*
  - ION TRANSPORT
    - TRACER STUDY, 4984*
  - IRON
    - CIRRHOSIS, 4987*
    - PANCREATECTOMY, 4987*
  - LIPIDS
    - METABOLISM, 5082*
    - PEROXIDATION, 5078*
  - METABOLISM
    - ALCOHOL, 5060*
    - IRON, 5074*
    - METEOROLOGICAL FACTORS, 5055*
  - METASTASES
    - DIAGNOSIS, 5144
    - DRUG TREATMENT, 5288*
    - JAUNDICE, OBSTRUCTIVE, 5377
  - MITOCHONDRIA
    - METEOROLOGICAL FACTORS, 5055*
  - MITOSIS
    - DRUG EFFECTS ON, 5089
    - REGENERATION, 5089
  - MORPHOLOGY
    - ANTINEOPLASTIC AGENTS, 4966, 4967, 4968
    - BILE ACIDS, 4946*
    - CIRRHOSIS, 5433
    - ENZYMES, 4952
    - ETHIONINE, 4971
    - HEPATITIS, VIRAL, 5400*
    - HORMONE EFFECTS ON, 4965
    - HYDROCARBONS, HALOGENATED, 5057*
    - KETOSIS, 4962
    - LIPIDS, 4972
    - LIVER DISEASE, ALCOHOLIC, 5424*
    - NAPHTHYLISOTHIOCYANATE, ALPHA, 4971
    - PRECANCER, 4972
    - STARVATION, 4962
    - TEMPERATURE, 4958
  - NECROSIS
    - DRUG-INDUCED, 5385*
  - NEONATE
    - ULTRASTRUCTURE, 4953
  - NEOPLASMS, MALIGNANT
    - ANGIOGRAPHY, 5142
    - ANTIGEN, AUSTRALIA, 5402*
    - CHEMOTHERAPY, 5372
    - CHILDREN, 5370*
    - CONTRAST MEDIA, 5365*
    - FETOPROTEIN, ALPHA, 5402*
    - HYPERCALCEMIA, 5365*
    - HYPOGLYCEMIA, 5375
    - IMMUNOTHERAPY, 5374
  - NUCLEIC ACIDS
    - BINDING, 5091
    - POLYCYCLIC HYDROCARBONS, 5091
    - SYNTHESIS, 5448
  - NUCLEOTIDES
    - ULTRASTRUCTURE, 4953
  - PARASITES AND PARASITIC DISEASE
    - BLEEDING, 5509
    - IMMUNOLOGY, 5517
    - MORPHOLOGY, 5517

- PERFUSION
  - ELECTROLYTE, 5083*
  - MITOCHONDRIA, 5083*
  - TECHNIQUES, 5083*
- PHOSPHATASE
  - BILE, 5070
- PHOSPHOLIPID
  - DIETARY FACTORS, 5059*
- PHOSPHORYLASE
  - DEFICIENCY, 5364*
- PRECANCER
  - CHOLESTEROL, 5067*
- PROTEIN
  - METABOLISM, 5082*
- REGENERATION
  - CHEMICAL PROPERTIES, 5063*
  - HEPATECTOMY, 5056*, 5064*
  - PHYSICAL PROPERTIES, 5063*
- SCANNING, SCINTILLATION, 5177
  - PORTACAVAL SHUNT, 5150
  - TECHNIQUES, 5143, 5149, 5162
- SCHISTOSOMIASIS
  - FIBROSIS, 5506
  - GLUCOSE INTOLERANCE, 5506
- SURGERY
  - CLOTTING, 5369*
- TISSUE CULTURE
  - MORPHOLOGY, 4957
- TRANSPLANTATION
  - REGENERATION, 5080*
  - TECHNIQUES, 5080*
- TRAUMA, 5490
  - SURGERY, 5473
- ULTRASTRUCTURE
  - CIRRHOSIS, 5432
  - DIABETES, 5432
  - HEPATITIS, CHRONIC, 5394*
  - HYDROCARBONS, HALOGENATED, 5057*
  - HYPOTHERMIA, 4974
  - IRON, 5074*

IVER COMA
- CIRRHOSIS
  - COMPLICATIONS, 5429*
- PERITONEUM
  - DIALYSIS, 5373
- PROGNOSIS, 5429*
  - CLOTTING, 5132*
- THERAPY
  - TRANSFUSION, 5373

IVER DISEASE
- AFLATOXIN
  - REVIEWS, 5378
- ANTIGEN, AUSTRALIA
  - EPIDEMIOLOGY, 5414
- BLOOD
  - PROTEIN, 5175
- CLOTTING, 5134*, 5135*, 5136*, 5401*, 5403*
- DIAGNOSIS
  - CLOTTING, 5132*
  - LAPAROSCOPY, 5156
- DISEASES ASSOCIATED WITH
  - KIDNEY, 5368*
- DRUG TREATMENT
  - VITAMIN E, 5388
- FIBRINOLYSIS, 5403*
- IMMUNOLOGY, 5426*
- LIVER FUNCTION TESTS, 5130*, 5135*
- PROTEIN
  - SYNTHESIS, 5134*
- THERAPY
  - DIET, 5379

LIVER DISEASE, ALCOHOLIC
- LIVER
  - FIBROSIS, 5425
  - MORPHOLOGY, 5424*
- MYELOPOIESIS, 5412*
- PROGNOSIS, 5424*
- THERAPY
  - AMINO ACIDS, 5423*

LIVER FUNCTION TESTS
- ANTIGEN, AUSTRALIA
  - CARRIER STATE, 5400*
- CIRRHOSIS, 5133*
- HEPATITIS, CHRONIC, 5133*
- HEPATITIS, VIRAL, 5410
  - DRUG ADDICTION, 5395*
- LIVER DISEASE, 5130*, 5135*
- PROGNOSIS
  - CIRRHOSIS, 5131*

LIVER INJURY
- BLOOD
  - AMINO ACIDS, 5086
- CARBON TETRACHLORIDE
  - AMINO ACIDS, 5086
- DRUG TREATMENT, 5058*
- LIVER
  - AMINO ACIDS, 5054*
- PHENOBARBITAL, 5061*
- PROTEIN
  - SYNTHESIS, 5054*
- ULTRASTRUCTURE
  - GALACTOSAMINE, 5071*

LYMPATICS
- SURGERY
  - PORTAL HYPERTENSION, 5434

LYMPH
- STOMACH
  - NEOPLASMS, MALIGNANT, 5199

LYMPHATICS
- ABDOMEN
  - CROHNS DISEASE, 5526
  - SARCOIDOSIS, 5526
- SMALL INTESTINE
  - OBSTRUCTION, 5108*

MAGNESIUM
- GASTROINTESTINAL
  - ABSORPTION, 5103

MALABSORPTION
- DIAGNOSIS, 5275
- DISEASES ASSOCIATED WITH, 5271*
- EPIDEMIOLOGY, 5269*
- LACTOSE
  - IRRITABLE COLON, 5291*
- MALNUTRITION
  - DISEASES ASSOCIATED WITH, 5269*
- SUGAR
  - CHILDREN, 5282

    - DIARRHEA, 5282
  - THERAPY, 5275
  - ULCERATIVE COLITIS
    - LACTASE DEFICIENCY, 5326*

ALIGNANT
  - SEE NEOPLASMS, MALIGNANT

ALNUTRITION
  - DISEASES ASSOCIATED WITH
    - MALABSORPTION, 5269*
  - EPIDEMIOLOGY, 5269*
  - PEPTIC ULCER
    - SURGERY, 5281
  - VITAMIN B12
    - ABSORPTION, 5270*

ANOMETRY
  - SEE PRESSURE STUDIES

ECKELS DIVERTICULUM
  - COMPLICATIONS
    - FOREIGN BODIES, 5245
  - RADIOLOGY, 5154
  - STRANGULATION, 5255

EGACOLON
  - LARGE INTESTINE
    - MOTILITY, 5002*
  - SMALL INTESTINE
    - MOTILITY, 5002*

ENETRIERES DISEASE
  - DISEASES ASSOCIATED WITH
    - PROTEIN-LOSING ENTEROPATHY, 5278

ESENTERY
  - INFLAMMATION
    - SMALL INTESTINE, 5454*

ETABOLISM
  - ALBUMIN
    - HYPERBILIRUBINEMIA, 5079*
  - ALKALOIDS
    - LIVER, 5084
  - AMINO ACIDS
    - LIVER, 5094*
    - PANCREAS, 4951
  - BILIRUBIN
    - PHENOBARBITAL, 5065*
    - PHOTOTHERAPY, 5068*
    - STEROID, 5065*
    - VITAMIN B2, 5068*
  - CATECHOLAMINES
    - PEPTIC ULCER, 5222
  - CHOLESTEROL
    - CARBOHYDRATE, 5109*
    - DIETARY FACTORS, 5109*
    - JAUNDICE, OBSTRUCTIVE, 5075*
    - SMALL INTESTINE, 5101
    - THYROID, 5077*
  - GASTRIN
    - KIDNEY, 5027*
  - HELMINTHIASIS
    - LIVER, 5518
  - HISTAMINE
    - CARBON TETRACHLORIDE, 5410
  - HORMONE
    - GASTROINTESTINAL, 5107
    - LIVER, 5447
  - LARGE INTESTINE
    - GLUCOSE, 4973
  - LIPIDS
    - ALCOHOL, 5066*
    - LIVER, 5082*
    - SMALL INTESTINE, 5082*
  - LIVER
    - ALCOHOL, 5060*
    - IRON, 5074*
    - METEOROLOGICAL FACTORS, 5055*
  - NARCOTICS
    - ENZYMES, 5087
  - NUCLEIC ACIDS
    - SMALL INTESTINE, 4960
  - PROTEIN
    - LIVER, 5082*
    - POLYPS, 5193*
    - SMALL INTESTINE, 5082*
  - STEROID
    - CIRRHOSIS, 5430*
  - STOMACH
    - NERVOUS CONTROL, 5037

METASTASES
  - BLOOD
    - GLUTAMYL TRANSPEPTIDASE, GAMMA, 5144
  - LIVER
    - DIAGNOSIS, 5144
    - DRUG TREATMENT, 5288*
    - JAUNDICE, OBSTRUCTIVE, 5377
  - PANCREAS
    - NEOPLASMS, MALIGNANT, 5347

METEOROLOGICAL FACTORS
  - LIVER
    - METABOLISM, 5055*
    - MITOCHONDRIA, 5055*

MICROORGANISMS
  - INTESTINE
    - DISEASES, 5264
  - LARGE INTESTINE, 5252

MITOCHONDRIA
  - LIVER
    - METEOROLOGICAL FACTORS, 5055*
    - PERFUSION, 5083*

MITOSIS
  - LIVER
    - DRUG EFFECTS ON, 5089
    - REGENERATION, 5089
  - PERITONEUM
    - REGENERATION, 5120

MORPHOLOGY
  - ESOPHAGUS
    - MUCUS, 5180*
  - GASTRITIS, ATROPHIC, 5158
  - GASTROINTESTINAL TRACT
    - NERVOUS SYSTEM, 4956
    - POSTURAL FACTORS, 4955
  - HEPATITIS, CHRONIC
    - REVIEWS, 5415
  - HEPATITIS, NONVIRAL
    - RADIATION, 5386*
  - ILEUM

    - VOLVULUS, 5323
  - JEJUNUM
    - SCLERODERMA, 5241*
  - LARGE INTESTINE
    - NEOPLASMS, MALIGNANT, 5289*
  - LIVER
    - ANTINEOPLASTIC AGENTS, 4966, 4967, 4968
    - BILE ACIDS, 4946*
    - CIRRHOSIS, 5433
    - ENZYMES, 4952
    - ETHIONINE, 4971
    - HEPATITIS, VIRAL, 5400*
    - HORMONE EFFECTS ON, 4965
    - HYDROCARBONS, HALOGENATED, 5057*
    - KETOSIS, 4962
    - LIPIDS, 4972
    - LIVER DISEASE, ALCOHOLIC, 5424*
    - NAPHTHYLISOTHIOCYANATE, ALPHA, 4971
    - PRECANCER, 4972
    - STARVATION, 4962
    - TEMPERATURE, 4958
    - TISSUE CULTURE, 4957
  - PARASITES AND PARASITIC DISEASE
    - LIVER, 5517
  - PERITONEUM
    - REGENERATION, 5119
  - SIGMOID
    - VOLVULUS, 5323
  - SMALL INTESTINE
    - IMMUNOGLOBULINS, 5271*
    - STARVATION, 4975
  - STOMACH
    - NEOPLASMS, MALIGNANT, 5191*
    - SURGERY, 4961

- MORTALITY
  - SEE SURVIVAL

- MOTILITY
  - DIETARY FACTORS
    - FIBER, 5006*
  - DUODENUM
    - ACID SECRETION, 5034
    - TRANQUILIZERS, 5008
  - ESOPHAGUS
    - NERVOUS CONTROL, 5001*
  - GALLBLADDER
    - NERVOUS CONTROL, 4964
  - GASTROINTESTINAL
    - PARATHYROID GLAND, 5007*
    - THYROID, 5007*
  - GASTROINTESTINAL TRACT
    - HORMONE EFFECTS ON, 5003*
  - INTESTINE
    - FIBER, 5006*
  - LARGE INTESTINE
    - MEGACOLON, 5002*
  - SMALL INTESTINE
    - DRUG EFFECTS ON, 5004*, 5009
    - MEGACOLON, 5002*
    - NERVOUS CONTROL, 5004*
  - STOMACH
    - ANTACIDS, 5011
    - DRUG EFFECTS ON, 5009
    - FEEDING, 5010
    - HORMONE EFFECTS ON, 5035
    - NERVOUS CONTROL, 5010
    - SCANNING, SCINTILLATION, 5123*
    - TRANQUILIZERS, 5008

- MUCOSA
  - DUODENUM
    - GLYCOPROTEINS, 4970
    - RADIOLOGY, 5256
  - SMALL INTESTINE
    - GASTROENTERITIS, 5238*

- MUCUS
  - ESOPHAGUS
    - MORPHOLOGY, 5180*
  - GLYCOPROTEINS
    - ULCERATIVE COLITIS, 5332
  - SMALL INTESTINE
    - ISOLATION, 4948*
  - STOMACH
    - PHYSICAL PROPERTIES, 5031

- MUSCULOSKELETAL SYSTEM
  - JEJUNUM
    - DILATATION, 5248

- MYCOSIS
  - SEE FUNGUS DISEASE

- MYELOPOIESIS
  - LIVER DISEASE, ALCOHOLIC, 5412*

- NAPHTHYLISOTHIOCYANATE, ALPHA
  - CHOLESTASIS
    - SIMULATION, 5081*
  - LIVER
    - DRUG METABOLISM, 5081*
    - MORPHOLOGY, 4971

- NARCOTICS
  - LIVER
    - DRUG METABOLISM, 5087
  - METABOLISM
    - ENZYMES, 5087
  - STOMACH
    - ACID SECRETION, 5014*

- NAUSEA
  - ANTIEMETICS, 5475

- NECROSIS
  - LIVER
    - DRUG-INDUCED, 5385*

- NEONATE
  - SEE ALSO AGE FACTORS, CHILDREN
  - ENTEROCOLITIS, 5302
  - GASTROENTERITIS
    - ISCHEMIA, 5481
  - JAUNDICE, OBSTRUCTIVE
    - SURGERY, 5438*
  - JEJUNUM
    - DILATATION, 5248
  - LIVER
    - ULTRASTRUCTURE, 4953
  - SMALL INTESTINE
    - ATRESIA, 5246
    - CALCIFICATION, 5265
    - VOLVULUS, 5251

- NEOPLASMS

DUODENUM
  BLEEDING, 5249
GASTROINTESTINAL
  ANGIOGRAPHY, 5139
PANCREAS
  CYTOLOGY, EXFOLIATIVE, 5140
PEPTIC ULCER
  ETIOLOGY, 5235
SALIVARY GLANDS, 5489
  DISEASES ASSOCIATED WITH, 5472
STOMACH
  CYTOLOGY, EXFOLIATIVE, 5140

EOPLASMS, BENIGN
SEE ALSO POLYPS
STOMACH
  NERVOUS SYSTEM, 5215
  SURGERY, 5200

EOPLASMS, MALIGNANT
BILIARY TRACT
  SURGERY, 5243
BLOOD
  CALCIUM, 5179*
COLON, 5288*
  BIOPSY, 5317
  ETIOLOGY, 5318
  THERAPY, 5308
  ULCERATIVE COLITIS, 5331
DUODENUM
  ENDOSCOPY, 5204
  SURGERY, 5258
ESOPHAGUS
  CALCIUM, 5179*
  INTUBATION, 5185, 5187
  RADIOTHERAPY, 5184
  SCLERODERMA, 5190
  SURGERY, 5184, 5187
GALLBLADDER
  CALCIFICATION, 5443
ILEUM
  BLEEDING, 5257
  RADIOLOGY, 5239*
LARGE INTESTINE
  IMMUNOLOGY, 5305
  MORPHOLOGY, 5289*
  RECURRENCE, 5311
  SURGERY, 5268, 5311
LIVER
  ANGIOGRAPHY, 5142
  ANTIGEN, AUSTRALIA, 5402*
  CHEMOTHERAPY, 5372
  CHILDREN, 5370*
  CONTRAST MEDIA, 5365*
  FETOPROTEIN, ALPHA, 5402*
  HYPERCALCEMIA, 5365*
  HYPOGLYCEMIA, 5375
  IMMUNOTHERAPY, 5374
PANCREAS, 5340, 5351
  METASTASES, 5347
  REVIEWS, 5344
  SURGERY, 5243, 5335*
PANCREATIC DUCT
  SURGERY, 5243
PEPTIC ULCER
  SURGERY, 5214
RECTUM, 5293, 5313
  BIOPSY, 5317
  ETIOLOGY, 5318
  RADIOTHERAPY, 5321
  THERAPY, 5308
SALIVARY GLANDS
  CYTOLOGY, 5482
  DIAGNOSIS, 5157
  NUCLEIC ACIDS, 5157, 5482
SMALL INTESTINE
  COMPLICATIONS, 5240*
  RADIOLOGY, 5253
  SURGERY, 5240*
STOMACH, 5210
  CARCINOGENS, 5192*
  ENDOSCOPY, 5129*
  EPIDEMIOLOGY, 5191*
  GENETIC FACTORS, 5192*
  HORMONE EFFECTS ON, 5206
  LYMPH, 5199
  MORPHOLOGY, 5191*
  NERVOUS SYSTEM, 5215
  RADIOTHERAPY, 5184
  SCANNING, SCINTILLATION, 5155
  SURGERY, 5184, 5199

NERVOUS CONTROL
ESOPHAGUS
  MOTILITY, 5001*
  PERISTALSIS, 5012
  SPHINCTER, 5001*
GALLBLADDER
  MOTILITY, 4964
SMALL INTESTINE
  IRRADIATION, 5450
  MOTILITY, 5004*
STOMACH
  ACID SECRETION, 5028*
  METABOLISM, 5037
  MOTILITY, 5010

NERVOUS SYSTEM
BILIARY TRACT
  ATRESIA, 5445
GASTROINTESTINAL TRACT
  MORPHOLOGY, 4956
HIRSCHSPRUNGS DISEASE
  PATHOLOGY, 5286*
STOMACH
  NEOPLASMS, BENIGN, 5215
  NEOPLASMS, MALIGNANT, 5215

NUCLEIC ACIDS
DUODENUM
  ANTRECTOMY, 4949*
  GASTRIN, 4949*
LIVER
  BINDING, 5091
  POLYCYCLIC HYDROCARBONS, 5091
METABOLISM
  SMALL INTESTINE, 4960
SALIVARY GLANDS
  NEOPLASMS, MALIGNANT, 5157, 5482
SMALL INTESTINE
  RADIATION, 5106
STOMACH
  ANTRECTOMY, 4949*
  GASTRIN, 4949*
SYNTHESIS
  CARBON TETRACHLORIDE, 5448
  GALACTOSAMINE, 5071*
  JEJUNUM, 5099*

    - LIVER, 5446

- NUCLEOTIDES
  - LIVER
    - ULTRASTRUCTURE, 4953

- OBESITY
  - SURGERY
    - TECHNIQUES, 5261

- OBSTRUCTION
  - BILIARY TRACT
    - IMMUNOLOGY, 5426*
  - COLON
    - FOREIGN BODIES, 5287*
    - POLYPS, 5322
  - DUODENUM
    - HODGKINS DISEASE, 5263
  - ESOPHAGUS
    - INTUBATION, 5186
  - PANCREATIC DUCT
    - STOMACH, 5440
  - PANCREATITIS, CHRONIC
    - SURGERY, 5353*
  - SMALL INTESTINE
    - LYMPHATICS, 5108*
    - SURGERY, 5266

- OBSTRUCTIVE JAUNDICE
  - SEE JAUNDICE, OBSTRUCTIVE

- PANCREAS
  - AMINO ACIDS
    - CHOLINERGIC AGENTS, 5047*
    - HORMONE EFFECTS ON, 5047*
    - METABOLISM, 4951
  - ANOMALY, CONGENITAL, 5341
  - ASCITES
    - ALCOHOLISM, 5337
  - BIOPSY
    - TECHNIQUES, 5140
  - ESTROGENS
    - BINDING, 5053
  - EXCRETION
    - ANTICONVULSANTS, 5051
  - HETEROTOPIA
    - STOMACH, 5342
  - HYPERPLASIA
    - DIARRHEA, 5345
  - LIPASE
    - SIMULATION, 5043*
  - LIPIDS
    - CYSTIC FIBROSIS, 5343
    - DISEASES ASSOCIATED WITH, 5348
  - NEOPLASMS
    - CYTOLOGY, EXFOLIATIVE, 5140
  - NEOPLASMS, MALIGNANT, 5340, 5351
    - METASTASES, 5347
    - REVIEWS, 5344
    - SURGERY, 5243, 5335*
  - PERFUSION
    - REVIEWS, 5048
    - TECHNIQUES, 5050
  - PSEUDOCYST
    - COLON, 5346
    - DUODENUM, 5346
    - ETIOLOGY, 5336*
    - RADIOLOGY, 5338
    - THERAPY, 5336*
  - SCANNING, SCINTILLATION
    - TECHNIQUES, 5145
  - SECRETION
    - CYCLIC ADENOSINE MONOPHOSPHATE, 5046*
    - HYPERCALCEMIA, 5044*
    - PROSTAGLANDIN, 5045*
    - SECRETIN, 5046*
  - TRAUMA, 5352
    - DIAGNOSIS, 5350
    - REVIEWS, 5349
    - SURGERY, 5473
  - ZYMOGENS
    - CYTOLOGY, 4963

- PANCREAS DISEASE
  - RADIOLOGY
    - TECHNIQUES, 5141

- PANCREATECTOMY
  - ABSORPTION
    - IRON, 4987*
  - LIVER
    - IRON, 4987*

- PANCREATIC DUCT
  - ENDOSCOPY, 5138
    - TECHNIQUES, 5148
  - NEOPLASMS, MALIGNANT
    - SURGERY, 5243
  - OBSTRUCTION
    - STOMACH, 5440
  - RADIOLOGY, 5161
  - REFLUX
    - PANCREATITIS, 5358

- PANCREATITIS, 5361
  - BILIARY TRACT
    - SURGERY, 5355*
  - BLOOD
    - LIPIDS, 5485
  - DIAGNOSIS, 5172
  - ETIOLOGY
    - FAMILIAL FACTORS, 5354*
  - PANCREATIC DUCT
    - REFLUX, 5358
  - PSEUDOCYST
    - RADIOLOGY, 5360
    - SURGERY, 5357
  - STOMACH
    - SURGERY, 5355*
  - THERAPY, 5356, 5363
    - SIMULATION, 5362

- PANCREATITIS, CHRONIC, 5361
  - SURGERY
    - OBSTRUCTION, 5353*
    - TECHNIQUES, 5359

- PARASITES AND PARASITIC DISEASE
  - EPIDEMIOLOGY, 5498, 5499
    - ETHNIC FACTORS, 5510, 5515
  - INTESTINE, 5511
    - EPIDEMIOLOGY, 5513
    - IMMUNOLOGY, 5511
  - LIVER
    - BLEEDING, 5509
    - IMMUNOLOGY, 5517
    - MORPHOLOGY, 5517

ARATHYROID GLAND
  GASTROINTESTINAL
    MOTILITY, 5007*

ARATYPHOID FEVER
  SEE SALMONELLOSIS

ATHOLOGY
  DUODENUM
    ULCER, 5217*
  HIRSCHSPRUNGS DISEASE
    NERVOUS SYSTEM, 5286*

ENTAGASTRIN
  STOMACH
    ACID SECRETION, 5015*, 5021*
    ADENYL CYCLASE, 5039
    CYCLIC ADENOSINE MONOPHOSPHATE, 5033

EPSIN
  ACIDITY, 5118
  IRRADIATION, 5118
  STOMACH
    GASTRITIS, 5195*

EPTIC ULCER
  SEE ALSO STOMACH ULCER, DUODENUM ULCER
  AORTA
    ANEURYSM, 5230
  BLEEDING
    PYLOROPLASTY, 5219
    SURGERY, 5236
    VAGOTOMY, 5219
  CATECHOLAMINES
    METABOLISM, 5222
  DRUG TREATMENT, 5023*
    GLUCOSE, 5024*
  ENDOSCOPY
    ASPIRIN, 5229
  ETIOLOGY, 5231
    NEOPLASMS, 5235
  GASTRECTOMY, 5234
  PYLOROPLASTY, 5220
  SURGERY, 5223, 5228
    KWASHIORKOR, 5281
    MALNUTRITION, 5281
    NEOPLASMS, MALIGNANT, 5214
    SEQUELAE, 5214, 5224, 5484
  VAGOTOMY, 5220
    GASTRIN, 5194*

ERFORATION
  ABDOMEN
    RADIOLOGY, 5207
  COLON
    ILEUS, 5265*
  ESOPHAGUS
    DIAGNOSIS, 5181*
    ETIOLOGY, 5181*
    THERAPY, 5181*
  GASTROINTESTINAL
    SEPSIS, 5463

ERFUSION
  LIVER
    ELECTROLYTE, 5083*
    MITOCHONDRIA, 5083*
    TECHNIQUES, 5083*

  PANCREAS
    REVIEWS, 5048
    TECHNIQUES, 5050

PERISTALSIS
  ESOPHAGUS
    DRUG EFFECTS ON, 5012
    NERVOUS CONTROL, 5012

PERITONEUM
  DIALYSIS
    LIVER COMA, 5373
  FIBROSIS
    LISTERIOSIS, 5477
  REGENERATION
    MITOSIS, 5120
    MORPHOLOGY, 5119
  TUBERCULOSIS, 5462

PERITONITIS
  INFECTION, BACTERIA
    CHILDREN, 5457

PEROXIDASE
  SMALL INTESTINE
    CHOLERA, 5100*

PEROXIDATION
  LIPIDS
    LIVER, 5078*

PHENOBARBITAL
  BILE
    EXCRETION, 4993
    SECRETION, 5065*
  BILIRUBIN
    METABOLISM, 5065*
  LIVER INJURY, 5061*

PHOSPHATASE
  LIVER
    BILE, 5070

PHOSPHATASE, ALKALINE
  SMALL INTESTINE
    RADIATION, 4959

PHOSPHATE
  ABSORPTION
    INTESTINE, 4989*
    VITAMIN D, 4989*

PHOSPHOLIPID
  LIVER
    DIETARY FACTORS, 5059*

PHOSPHORYLASE
  DEFICIENCY
    DIAGNOSIS, 5364*
    LIVER, 5364*

PHOTOTHERAPY
  BILIRUBIN
    METABOLISM, 5068*
  HYPERBILIRUBINEMIA
    PREMATURITY, 5383

PHYSICAL ACTIVITY
  GASTROINTESTINAL

- SECRETION, 5013*

- PHYSICAL FACTORS
  - FATTY ACIDS
    - ABSORPTION, 4977*

- PHYSICAL PROPERTIES
  - ANTIGEN, AUSTRALIA, 5393*
  - BILIRUBIN
    - IRRADIATION, 5110*
  - LIVER
    - REGENERATION, 5063*
  - STOMACH
    - MUCUS, 5031
  - TRYPSIN, 5049

- PIGMENTATION
  - LARGE INTESTINE, 5307

- PLASMA
  - SEE BLOOD

- POLYCYCLIC HYDROCARBONS
  - LIVER
    - NUCLEIC ACIDS, 5091

- POLYPS
  - SEE ALSO NEOPLASMS, BENIGN
  - COLON, 5295
    - EOSINOPHILS, 5322
    - OBSTRUCTION, 5322
  - LARGE INTESTINE
    - SURGERY, 5319
  - PROTEIN
    - METABOLISM, 5193*
  - STOMACH
    - PROTEIN, 5193*

- PORTACAVAL SHUNT
  - LIVER
    - SCANNING, SCINTILLATION, 5150

- PORTAL HYPERTENSION
  - LYMPHATICS
    - SURGERY, 5434
  - SCANNING, SCINTILLATION
    - SPLEEN, 5121*

- POSTURAL FACTORS
  - GASTROINTESTINAL TRACT
    - MORPHOLOGY, 4955

- PRECANCER
  - LIVER
    - CHOLESTEROL, 5067*
    - MORPHOLOGY, 4972

- PREGNANCY
  - JAUNDICE, 5480
  - LIVER
    - BLEEDING, 5480

- PREMATURITY
  - HYPERBILIRUBINEMIA
    - PHOTOTHERAPY, 5383

- PREVENTION
  - HEPATITIS, SERUM
    - DIALYSIS, 5391*

- PROGNOSIS
  - CIRRHOSIS, 5424*
    - LIVER FUNCTION TESTS, 5131*
  - HEPATITIS, VIRAL
    - CERULOPLASMIN, 5124*
  - LIVER COMA, 5429*
    - CLOTTING, 5132*
  - LIVER DISEASE, ALCOHOLIC, 5424*

- PROSTAGLANDIN
  - ELECTROLYTE
    - ABSORPTION, 4982*
  - GASTROINTESTINAL TRACT, 5112
  - GLUCOSE
    - ABSORPTION, 4982*
  - PANCREAS
    - SECRETION, 5045*
  - STOMACH
    - ACID SECRETION, 5036
  - WATER
    - ABSORPTION, 4982*

- PROTEIN
  - BLOOD
    - LIVER DISEASE, 5175
  - DIGESTION
    - STOMACH, 5440
  - LIVER
    - CHEMICAL COMPOSITION, 5447
  - METABOLISM
    - LIVER, 5082*
    - POLYPS, 5193*
    - SMALL INTESTINE, 5062*
  - SMALL INTESTINE
    - DRUG EFFECTS ON, 5093*
  - STOMACH
    - POLYPS, 5193*
  - SYNTHESIS
    - GALACTOSAMINE, 5071*
    - LIVER DISEASE, 5134*
    - LIVER INJURY, 5054*

- PROTEIN-LOSING ENTEROPATHY
  - HEPATITIS, VIRAL
    - SEQUELAE, 5278
  - MENETRIERES DISEASE
    - DISEASES ASSOCIATED WITH, 5278

- PROTOZOA
  - FECES
    - DIAGNOSIS, 5153
    - TECHNIQUES, 5153

- PSEUDOCYST
  - PANCREAS
    - COLON, 5346
    - DUODENUM, 5346
    - ETIOLOGY, 5336*
    - RADIOLOGY, 5336
    - THERAPY, 5336*
  - PANCREATITIS
    - RADIOLOGY, 5360
    - SURGERY, 5357
  - SURGERY
    - COMPLICATIONS, 5339

- PSYCHOLOGICAL FACTORS
  - CELIAC DISEASE
    - CHILDREN, 5272*

- ILEOSTOMY
    - THERAPY, 5267

YLOROPLASTY
- PEPTIC ULCER, 5220
    - BLEEDING, 5219

YLORUS
- SEE ALSO STOMACH
- DISEASES, 5208
- REGIONAL ENTERITIS
    - DIAGNOSIS, 5525
- SPHINCTER
    - HORMONE CONTROL, 5005*
- STENOSIS
    - CONGENITAL, 5196

ADIATION
- HEPATITIS, NONVIRAL
    - MORPHOLOGY, 5386*
- INTESTINE
    - RADIOPROTECTIVE AGENTS, 5102
- SMALL INTESTINE
    - DRUG EFFECTS ON, 5104
    - NUCLEIC ACIDS, 5106
    - PHOSPHATASE, ALKALINE, 4959
- VILLI
    - ATROPHY, 4959

ADIOIMMUNOASSAY
- ANTIGEN, AUSTRALIA
    - TECHNIQUES, 5397*

ADIOLOGY
- ABDOMEN
    - PERFORATION, 5207
- BILE DUCT, 5161
- BILIARY DISEASE, 5167
- BILIARY TRACT, 5163
- DUODENUM, 5167
    - MUCOSA, 5256
- GALLBLADDER
    - CONTRAST MEDIA, 5165
    - TECHNIQUES, 5165
- GASTRITIS, ATROPHIC, 5158
- ILEUM
    - COLITIS, GRANULOMATOUS, 5333
    - NEOPLASMS, MALIGNANT, 5239*
- JEJUNUM
    - SCLERODERMA, 5241*
- LARGE INTESTINE
    - CONTRAST MEDIA, 5146
- MECKELS DIVERTICULUM, 5154
- PANCREAS
    - PSEUDOCYST, 5338
- PANCREAS DISEASE
    - TECHNIQUES, 5141
- PANCREATIC DUCT, 5161
- PANCREATITIS
    - PSEUDOCYST, 5360
- SMALL INTESTINE
    - NEOPLASMS, MALIGNANT, 5253
- STOMACH
    - CONTRAST MEDIA, 5159
    - FISTULA, 5201

ADIOPROTECTIVE AGENTS
- INTESTINE
    - RADIATION, 5102

RADIOTHERAPY
- ESOPHAGUS
    - NEOPLASMS, MALIGNANT, 5184
- RECTUM
    - NEOPLASMS, MALIGNANT, 5321
- STOMACH
    - NEOPLASMS, MALIGNANT, 5184

RECTUM
- SEE ALSO LARGE INTESTINE
- NEOPLASMS, MALIGNANT, 5293, 5313
    - BIOPSY, 5317
    - ETIOLOGY, 5318
    - RADIOTHERAPY, 5321
    - THERAPY, 5308
- SCHISTOSOMIASIS
    - SURGERY, 5508
- SURGERY
    - INFECTION, BACTERIA, 5304

RECURRENCE
- LARGE INTESTINE
    - NEOPLASMS, MALIGNANT, 5311

REFLUX
- PANCREATIC DUCT
    - PANCREATITIS, 5358

REGENERATION
- LIVER
    - CHEMICAL PROPERTIES, 5063*
    - HEPATECTOMY, 5056*, 5064*
    - MITOSIS, 5089
    - PHYSICAL PROPERTIES, 5063*
    - TRANSPLANTATION, 5080*
- PERITONEUM
    - MITOSIS, 5120
    - MORPHOLOGY, 5119

REGIONAL ENTERITIS
- SEE ALSO ENTERITIS
- COMPLICATIONS
    - ILEUM, 5521*
- DRUG TREATMENT
    - TECHNIQUES, 5524
- DUODENUM
    - DIAGNOSIS, 5525
    - REVIEWS, 5522
    - SURGERY, 5520*
- PYLORUS
    - DIAGNOSIS, 5525
- STOMACH
    - REVIEWS, 5522
- SURGERY
    - TECHNIQUES, 5523, 5527
- TUBERCULOSIS
    - CECUM, 5519*
    - ILEUM, 5519*

REVIEWS
- AMEBIASIS
    - LIVER, 5505
- CROHNS DISEASE, 5329
- DEFECATION, 5299
- DIARRHEA
    - ESCHERICHIA COLI, 5470
- DUODENUM
    - REGIONAL ENTERITIS, 5522
    - TRAUMA, 5349

- HEPATITIS, CHRONIC, 5419, 5421
  - CHILDREN, 5417
  - DIAGNOSIS, 5418
  - IMMUNOLOGY, 5420
  - MORPHOLOGY, 5415
- HEPATITIS, VIRAL, 5411
- LACTOSE INTOLERANCE
  - DIETARY FACTORS, 5283
  - ETHNIC FACTORS, 5283
- LIVER DISEASE
  - AFLATOXIN, 5378
- PANCREAS
  - NEOPLASMS, MALIGNANT, 5344
  - PERFUSION, 5048
  - TRAUMA, 5349
- REYES SYNDROME, 5474
- STOMACH
  - REGIONAL ENTERITIS, 5522
- ULCERATIVE COLITIS, 5329

REYES SYNDROME
- ETIOLOGY
  - INFECTION, VIRUS, 5366*
- REVIEWS, 5474

SALIVARY GLANDS
- AUTOIMMUNITY
  - SJOGRENS SYNDROME, 5479
- NEOPLASMS, 5489
  - DISEASES ASSOCIATED WITH, 5472
- NEOPLASMS, MALIGNANT
  - CYTOLOGY, 5482
  - DIAGNOSIS, 5157
  - NUCLEIC ACIDS, 5157, 5482

SALMONELLOSIS
- CHOLECYSTITIS
  - ETIOLOGY, 5452

SARCOIDOSIS
- ABDOMEN
  - LYMPHATICS, 5526

SCANNING, SCINTILLATION
- ABDOMEN
  - TRAUMA, 5160
- ESOPHAGUS
  - DISEASES, 5126*
- GALLBLADDER
  - DISEASES, 5128*
- LIVER, 5177
  - PORTACAVAL SHUNT, 5150
  - TECHNIQUES, 5143, 5149, 5162
- PANCREAS
  - TECHNIQUES, 5145
- SPLEEN
  - PORTAL HYPERTENSION, 5121*
- STOMACH
  - MOTILITY, 5123*
  - NEOPLASMS, MALIGNANT, 5155

SCHISTOSOMIASIS
- EPIDEMIOLOGY, 5514
- ETIOLOGY
  - CHILDREN, 5501
- LIVER
  - FIBROSIS, 5494*, 5506
  - GLUCOSE INTOLERANCE, 5506
- SIMULATION
  - IMMUNOLOGY, 5492*, 5493*
- SURGERY
  - RECTUM, 5508

SCLERODERMA
- ESOPHAGUS
  - NEOPLASMS, MALIGNANT, 5190
- JEJUNUM
  - MORPHOLOGY, 5241*
  - RADIOLOGY, 5241*

SECRETIN
- PANCREAS
  - SECRETION, 5046*

SECRETION
- BILE
  - BILE ACIDS, 5062*
  - CONTRAST MEDIA, 5062*
  - PHENOBARBITAL, 5065*
  - STEROID, 5065*
  - SULFOBROMOPHTHALEIN, 5062*
- BILE ACIDS
  - CHOLECYSTECTOMY, 5436*
  - INTESTINE, 4988*
- FATTY ACIDS
  - INTESTINE, 4988*
- GASTROINTESTINAL
  - PHYSICAL ACTIVITY, 5013*
- PANCREAS
  - CYCLIC ADENOSINE MONOPHOSPHATE, 5046*
  - HYPERCALCEMIA, 5044*
  - PROSTAGLANDIN, 5045*
  - SECRETIN, 5046*
- STOMACH
  - AGE FACTORS, 5022*
  - CALCIUM, 5032
  - CONSTITUTIONAL FACTORS, 5022*
  - HISTAMINE, 5038
  - HORMONE EFFECTS ON, 5035
  - TECHNIQUES, 5042

SEPSIS
- ABDOMEN
  - TRAUMA, 5463
- GASTROINTESTINAL
  - PERFORATION, 5463

SEQUELAE
- HEPATITIS, VIRAL
  - PROTEIN-LOSING ENTEROPATHY, 5278
- PEPTIC ULCER
  - SURGERY, 5214, 5224, 5484
- STOMACH
  - SURGERY, 5202, 5205, 5211

SERUM
- SEE BLOOD
- GASTRIN
  - HYDROLYSIS, 5113

SHIGELLOSIS
- DYSENTERY
  - COMPLICATIONS, 5455*
- TOXIN
  - TISSUE CULTURE, 5476

SHOCK

- BLEEDING
    - ABSORPTION, 4999
- ELECTROLYTE
    - TRANSPORT, 4976*
- INTESTINE
    - ABSORPTION, 4999

GMOID
- SEE ALSO LARGE INTESTINE
- STENOSIS, 5294
- VOLVULUS
    - DISEASES ASSOCIATED WITH, 5284*
    - MORPHOLOGY, 5323
    - SURGERY, 5323

MULATION
- CHOLESTASIS
    - NAPHTHYLISOTHIOCYANATE, ALPHA, 5081*
- FATTY LIVER
    - ALCOHOL, 5066*
- GASTROENTERITIS, 5238*
- HELMINTHIASIS
    - LIVER, 5518
- LARGE INTESTINE
    - ADHESIONS, 5320
- PANCREAS
    - LIPASE, 5043*
- PANCREATITIS
    - THERAPY, 5362
- SCHISTOSOMIASIS
    - IMMUNOLOGY, 5492*, 5493*
- ULCERATIVE COLITIS
    - DRUG-INDUCED, 5334

OGRENS SYNDROME
- SALIVARY GLANDS
    - AUTOIMMUNITY, 5479

ALL INTESTINE
- SEE ALSO DUODENUM, JEJUNUM, ILEUM
- SEE ALSO INTESTINE
- ABSORPTION
    - TECHNIQUES, 4983*
    - TRACE ELEMENT, 4983*
- ANASTOMOSIS
    - DRUG EFFECTS ON, 5244
- ATRESIA
    - CONGENITAL, 5246
    - NEONATE, 5246
- BIOPSY, 5441
    - CHILDREN, 5137, 5152
    - TECHNIQUES, 5137, 5152
- CALCIFICATION
    - NEONATE, 5265
    - SURGERY, 5265
- CALCIUM
    - ABSORPTION, 4980*
- CHOLESTEROL
    - METABOLISM, 5101
- DISACCHARIDASE
    - AGE FACTORS, 5096*
    - CORTICOSTEROIDS, 5096*
- DISACHARIDASE
    - AGE FACTORS, 5095*
- GLUCOSE
    - ABSORPTION, 4981*
- IMMUNOGLOBULINS, 5097*
- INFILTRATION
    - EOSINOPHILS, 5262
- ION TRANSPORT
    - ENTERECTOMY, 5000
- IRON
    - ABSORPTION, 4995
- ISCHEMIA
    - DIAGNOSIS, 5250
- LACTASE
    - DIETARY FACTORS, 5095*
- LIPIDS
    - DRUG EFFECTS ON, 5093*
    - METABOLISM, 5082*
- LYMPHATICS
    - OBSTRUCTION, 5108*
- MESENTERY
    - INFLAMMATION, 5454*
- MORPHOLOGY
    - IMMUNOGLOBULINS, 5271*
    - STARVATION, 4975
- MOTILITY
    - DRUG EFFECTS ON, 5004*, 5009
    - MEGACOLON, 5002*
    - NERVOUS CONTROL, 5004*
- MUCOSA
    - GASTROENTERITIS, 5238*
- MUCUS
    - ISOLATION, 4948*
- NEOPLASMS, MALIGNANT
    - COMPLICATIONS, 5240*
    - RADIOLOGY, 5253
    - SURGERY, 5240*
- NERVOUS CONTROL
    - IRRADIATION, 5450
- NUCLEIC ACIDS
    - METABOLISM, 4960
    - RADIATION, 5106
- OBSTRUCTION
    - SURGERY, 5266
- PEROXIDASE
    - CHOLERA, 5100*
- PHOSPHATASE, ALKALINE
    - RADIATION, 4959
- PROTEIN
    - DRUG EFFECTS ON, 5093*
    - METABOLISM, 5082*
- RADIATION
    - DRUG EFFECTS ON, 5104
- SODIUM
    - ABSORPTION, 4981*
- TEMPERATURE, 5114
- TRANSPLANTATION
    - DRUG EFFECTS ON, 5247
    - SURVIVAL, 5105
- VITAMIN C
    - ABSORPTION, 4979*
- VOLVULUS
    - NEONATE, 5251
    - SURGERY, 5251

SODIUM
- ABSORPTION
    - SMALL INTESTINE, 4981*

SONOGRAPHY
- SEE ECHOGRAPHY

SPHINCTER
- ESOPHAGUS
    - NERVOUS CONTROL, 5001*

- PYLORUS
    - HORMONE CONTROL, 5005*

SPLEEN
- SCANNING, SCINTILLATION
    - PORTAL HYPERTENSION, 5121*

STAPHYLOCOCCUS
- FOOD POISONING, 5465

STARVATION
- LIVER
    - MORPHOLOGY, 4962
- SMALL INTESTINE
    - MORPHOLOGY, 4975

STEATOSIS
- SEE FATTY LIVER

STENOSIS
- BILIARY TRACT
    - SURGERY, 5446
- PYLORUS
    - CONGENITAL, 5196
- SIGMOID, 5294

STEROID
- BILE
    - SECRETION, 5065*
- BILIRUBIN
    - METABOLISM, 5065*
- GLYCOGEN
    - SYNTHESIS, 5090
- LIVER
    - GLUCONEOGENESIS, 5090
- METABOLISM
    - CIRRHOSIS, 5430*
- STOMACH
    - ACID SECRETION, 5018*

STEROIDS
- HEPATITIS, VIRAL
    - TISSUE CULTURE, 5390*

STOMACH
- SEE ALSO ANTRUM, PYLORUS
- ACID SECRETION, 5440
    - ACIDITY, 5018*
    - ADRENERGIC BLOCKING AGENTS, 5025*
    - ANTIDEPRESSANTS, 5014*
    - CYCLIC ADENOSINE MONOPHOSPHATE, 5020*
    - DRUG EFFECTS ON, 5023*
    - FATTY ACIDS, 5019*
    - GASTRITIS, 5195*
    - GENETIC FACTORS, 5041
    - GLUCOSE, 5024*
    - HISTAMINE, 5015*, 5016*
    - HORMONE CONTROL, 5041
    - HORMONE EFFECTS ON, 5016*, 5029*
    - INHIBITION, 5017*
    - INSULIN, 5028*
    - NARCOTICS, 5014*
    - NERVOUS CONTROL, 5026*
    - PENTAGASTRIN, 5015*, 5021*
    - PROSTAGLANDIN, 5036
    - STEROID, 5018*
    - TECHNIQUES, 5030, 5034
    - TRANQUILIZERS, 5014*
- ACIDITY
    - ACID SECRETION, 5021*
- ADENYL CYCLASE
    - HISTAMINE, 5039
    - PENTAGASTRIN, 5039
- BIOPSY, 5127*
    - TECHNIQUES, 5140
- CARBONIC ANHYDRASE
    - CYCLIC ADENOSINE MONOPHOSPHATE, 5020*
- CHEMICAL COMPOSITION, 5040
- CIRCULATION
    - ADRENERGIC BLOCKING AGENTS, 5025*
- CYCLIC ADENOSINE MONOPHOSPHATE, 5033
    - FEEDING, 5033
    - PENTAGASTRIN, 5033
- ELECTROPHYSIOLOGY
    - HORMONE EFFECTS ON, 5029*
- ENDOSCOPY, 5127*, 5259
- FISTULA, 5232
    - RADIOLOGY, 5201
- FOREIGN BODIES, 5224
    - ENDOSCOPY, 5198
- METABOLISM
    - NERVOUS CONTROL, 5037
- MOTILITY
    - ANTACIDS, 5011
    - DRUG EFFECTS ON, 5009
    - FEEDING, 5010
    - HORMONE EFFECTS ON, 5035
    - NERVOUS CONTROL, 5010
    - SCANNING, SCINTILLATION, 5123*
    - TRANQUILIZERS, 5008
- MUCUS
    - PHYSICAL PROPERTIES, 5031
- NEOPLASMS
    - CYTOLOGY, EXFOLIATIVE, 5140
- NEOPLASMS, BENIGN
    - SURGERY, 5200
- NEOPLASMS, MALIGNANT, 5210
    - CARCINOGENS, 5192*
    - ENDOSCOPY, 5129*
    - EPIDEMIOLOGY, 5191*
    - GENETIC FACTORS, 5192*
    - HORMONE EFFECTS ON, 5206
    - LYMPH, 5199
    - MORPHOLOGY, 5191*
    - RADIOTHERAPY, 5184
    - SCANNING, SCINTILLATION, 5155
    - SURGERY, 5184, 5199
- NERVOUS SYSTEM
    - NEOPLASMS, BENIGN, 5215
    - NEOPLASMS, MALIGNANT, 5215
- NUCLEIC ACIDS
    - ANTRECTOMY, 4949*
    - GASTRIN, 4949*
- PANCREAS
    - HETEROTOPIA, 5342
- PANCREATIC DUCT
    - OBSTRUCTION, 5440
- PEPSIN
    - GASTRITIS, 5195*
- POLYPS
    - PROTEIN, 5193*
- PROTEIN
    - DIGESTION, 5440
- RADIOLOGY
    - CONTRAST MEDIA, 5159
- REGIONAL ENTERITIS

    - REVIEWS, 5522
- SECRETION
  - AGE FACTORS, 5022*
  - CALCIUM, 5032
  - CONSTITUTIONAL FACTORS, 5022*
  - HISTAMINE, 5038
  - HORMONE EFFECTS ON, 5035
  - TECHNIQUES, 5042
- SURGERY
  - GASTRITIS, REFLUX, 5212
  - MORPHOLOGY, 4961
  - PANCREATITIS, 5355*
  - SEQUELAE, 5202, 5205, 5211
- TELANGIECTASIA
  - ENDOSCOPY, 5197
- ULCER, 5216*
  - ACIDITY, 5026*
  - BLEEDING, 5026*
  - COMPLICATIONS, 5232
  - DRUG EFFECTS ON, 5221
  - ENDOSCOPY, 5129*
  - ETIOLOGY, 5227
  - SURGERY, 5226
- ULTRASTRUCTURE
  - ALCOHOL, 4947*
- VOLVULUS
  - SURGERY, 5213

STOMACH ULCER
- SEE ALSO PEPTIC ULCER

STRANGULATION
- INTESTINE
  - E.COLI, 5242*
- MECKELS DIVERTICULUM, 5255

SUGAR
- ABSORPTION
  - INTESTINE, 4992
- MALABSORPTION
  - CHILDREN, 5282
  - DIARRHEA, 5282

SULFOBROMOPHTHALEIN
- BILE
  - SECRETION, 5062*

SURGERY
- ABDOMEN
  - COMPLICATIONS, 5463
- ABDOMEN, ACUTE
  - DISEASES ASSOCIATED WITH, 5471
- AMEBIASIS
  - LIVER, 5503
- ANORECTUM
  - FISTULA, 5309
- ANUS
  - SYPHILIS, 5301
- BILE DUCT
  - DILATATION, 5437*
  - TRAUMA, 5473
- BILIARY TRACT, 5163
  - NEOPLASMS, MALIGNANT, 5243
  - PANCREATITIS, 5355*
  - STENOSIS, 5446
- CECUM
  - VOLVULUS, 5298
- CIRRHOSIS
  - COMPLICATIONS, 5434
- COLON
  - ANOMALY, CONGENITAL, 5324
  - INFECTION, BACTERIA, 5304
  - VOLVULUS, 5298
- DUODENUM
  - NEOPLASMS, MALIGNANT, 5258
  - REGIONAL ENTERITIS, 5520*
- ESOPHAGITIS, 5189
- ESOPHAGUS
  - ATRESIA, 5182
  - NEOPLASMS, MALIGNANT, 5184, 5187
- GASTRODUODENAL
  - BLEEDING, 5203
- GASTROINTESTINAL
  - ANOMALY, CONGENITAL, 5468
- HEMORRHOIDS
  - TECHNIQUES, 5303
- HIATUS HERNIA, 5182, 5189
- HIRSCHSPRUNGS DISEASE
  - CHILDREN, 5312
  - TECHNIQUES, 5310
- ILEUM
  - VOLVULUS, 5323
- JAUNDICE, OBSTRUCTIVE
  - NEONATE, 5438*
- LARGE INTESTINE
  - NEOPLASMS, MALIGNANT, 5268, 5311
  - POLYPS, 5319
- LIVER
  - CLOTTING, 5369*
  - TRAUMA, 5473
- LYMPHATICS
  - PORTAL HYPERTENSION, 5434
- OBESITY
  - TECHNIQUES, 5261
- PANCREAS
  - NEOPLASMS, MALIGNANT, 5243, 5335*
  - TRAUMA, 5473
- PANCREATIC DUCT
  - NEOPLASMS, MALIGNANT, 5243
- PANCREATITIS
  - PSEUDOCYST, 5357
- PANCREATITIS, CHRONIC
  - OBSTRUCTION, 5353*
  - TECHNIQUES, 5359
- PEPTIC ULCER, 5223, 5228
  - BLEEDING, 5236
  - KWASHIORKOR, 5281
  - MALNUTRITION, 5281
  - NEOPLASMS, MALIGNANT, 5214
  - SEQUELAE, 5214, 5224, 5484
- PSEUDOCYST
  - COMPLICATIONS, 5339
- RECTUM
  - INFECTION, BACTERIA, 5304
- REGIONAL ENTERITIS
  - TECHNIQUES, 5523, 5527
- SCHISTOSOMIASIS
  - RECTUM, 5508
- SIGMOID
  - VOLVULUS, 5323
- SMALL INTESTINE
  - CALCIFICATION, 5265
  - NEOPLASMS, MALIGNANT, 5240*
  - OBSTRUCTION, 5266
  - VOLVULUS, 5251
- STOMACH
  - GASTRITIS, REFLUX, 5212
  - MORPHOLOGY, 4961

    - NEOPLASMS, BENIGN, 5200
    - NEOPLASMS, MALIGNANT, 5184, 5199
    - PANCREATITIS, 5355*
    - SEQUELAE, 5202, 5205, 5211
    - ULCER, 5226
    - VOLVULUS, 5213

SURVIVAL
- SMALL INTESTINE
    - TRANSPLANTATION, 5105

SYNTHESIS
- ALBUMIN
    - LIVER, 5065
- BILE ACIDS
    - THYROID, 5077*
- CHOLESTEROL
    - ETHIONINE, 5067*
- FATTY ACIDS
    - CITRIC ACID, 5072*
    - COENZYMES, 5072*
    - LIVER, 5072*
- GLYCOGEN
    - STEROID, 5090
- NUCLEIC ACIDS
    - CARBON TETRACHLORIDE, 5448
    - GALACTOSAMINE, 5071*
    - JEJUNUM, 5099*
    - LIVER, 5448
- PROTEIN
    - GALACTOSAMINE, 5071*
    - LIVER DISEASE, 5134*
    - LIVER INJURY, 5054*

SYPHILIS
- ANUS
    - SURGERY, 5301
- CHOLESTASIS
    - ETIOLOGY, 5384

TECHNIQUES
- AMEBIASIS
    - DIAGNOSIS, 5164
- ANTIGEN, AUSTRALIA, 5147, 5151, 5404*
    - RADIOIMMUNOASSAY, 5397*
- BILIARY TRACT
    - ANGIOGRAPHY, 5173
    - ENDOSCOPY, 5148
- COLON
    - ENDOSCOPY, 5148
- FECES
    - PROTOZOA, 5153
- GALLBLADDER
    - RADIOLOGY, 5165
- GASTROINTESTINAL
    - ENDOSCOPY, 5176
- HEMORRHOIDS
    - SURGERY, 5303
- HIRSCHSPRUNGS DISEASE
    - SURGERY, 5310
- LACTOSE INTOLERANCE
    - DIAGNOSIS, 5174
- LIVER
    - BIOPSY, 4954
    - PERFUSION, 5083*
    - SCANNING, SCINTILLATION, 5143, 5149, 5162
    - TRANSPLANTATION, 5080*
- OBESITY
    - SURGERY, 5261
- PANCREAS
    - BIOPSY, 5140
    - PERFUSION, 5050
    - SCANNING, SCINTILLATION, 5145
- PANCREAS DISEASE
    - RADIOLOGY, 5141
- PANCREATIC DUCT
    - ENDOSCOPY, 5148
- PANCREATITIS, CHRONIC
    - SURGERY, 5359
- REGIONAL ENTERITIS
    - DRUG TREATMENT, 5524
    - SURGERY, 5523, 5527
- SMALL INTESTINE
    - ABSORPTION, 4983*
    - BIOPSY, 5137, 5152
- STOMACH
    - ACID SECRETION, 5030, 5034
    - BIOPSY, 5140
    - SECRETION, 5042

TELANGIECTASIA
- ESOPHAGUS
    - ENDOSCOPY, 5197
- STOMACH
    - ENDOSCOPY, 5197

TEMPERATURE
- LIVER
    - HEALING, 4958
    - MORPHOLOGY, 4958
- SMALL INTESTINE, 5114

THERAPY
- SEE ALSO SPECIFIC THERAPEUTIC METHODS AND AGENTS
- CHOLEDOCHOLITHIASIS, 5451
- COLON
    - NEOPLASMS, MALIGNANT, 5308
- CONSTIPATION, 5467
- DIARRHEA
    - CHILDREN, 5478
- ESOPHAGUS
    - PERFORATION, 5181*
- ILEOSTOMY
    - PSYCHOLOGICAL FACTORS, 5267
- INTESTINE
    - FISTULA, 5314
- LIVER COMA
    - TRANSFUSION, 5373
- LIVER DISEASE
    - DIET, 5379
- LIVER DISEASE, ALCOHOLIC
    - AMINO ACIDS, 5423*
- MALABSORPTION, 5275
- PANCREAS
    - PSEUDOCYST, 5336*
- PANCREATITIS, 5356, 5363
    - SIMULATION, 5362
- RECTUM
    - NEOPLASMS, MALIGNANT, 5308

THYROID
- BILE ACIDS
    - SYNTHESIS, 5077*
- CHOLESTEROL
    - METABOLISM, 5077*
- GASTROINTESTINAL

    - MOTILITY, 5007*

- ISSUE CULTURE
  - HEPATITIS, VIRAL
    - STEROIDS, 5390*
  - LIVER
    - MORPHOLOGY, 4957
  - SHIGELLOSIS
    - TOXIN, 5476

- ORSION
  - GALLBLADDER
    - AGE FACTORS, 5444

- OXICITY
  - ANTIGEN, AUSTRALIA, 5399*
  - DIETARY FACTORS
    - CELIAC DISEASE, 5274*

- OXIN
  - CHOLERA
    - GANGLIOSIDES, 5111
    - INHIBITION, 5483
  - E.COLI
    - INHIBITION, 5483
  - SHIGELLOSIS
    - TISSUE CULTURE, 5476

- OXOPLASMOSIS
  - DIAGNOSIS
    - IMMUNOLOGY, 5170

- RACE ELEMENT
  - SMALL INTESTINE
    - ABSORPTION, 4983*

- RACER STUDY
  - DRUG METABOLISM
    - ANTISPASMODICS, 4998
  - GASTROINTESTINAL
    - ION TRANSPORT, 4997
  - LIVER
    - ION TRANSPORT, 4984*

- RANQUILIZERS
  - DUODENUM
    - MOTILITY, 5008
  - STOMACH
    - ACID SECRETION, 5014*
    - MOTILITY, 5008

- RANSFUSION
  - HEPATITIS, VIRAL
    - TRANSMISSION, 5405*
  - LIVER COMA
    - THERAPY, 5373

- RANSMISSION
  - HEPATITIS, SERUM, 5407, 5409
  - HEPATITIS, VIRAL, 5396*, 5398*
    - TRANSFUSION, 5405*
  - INFECTION, BACTERIA
    - ENTERITIS, 5456*
    - GASTROENTERITIS, 5466

- RANSPLANTATION
  - LIVER
    - REGENERATION, 5080*
    - TECHNIQUES, 5080*

  - SMALL INTESTINE
    - DRUG EFFECTS ON, 5247
    - SURVIVAL, 5105

- TRANSPORT
  - ELECTROLYTE
    - LIVER, 4976*
    - SHOCK, 4976*

- TRAUMA
  - ABDOMEN, 5460, 5490
    - SCANNING, SCINTILLATION, 5160
    - SEPSIS, 5463
  - BILE DUCT
    - SURGERY, 5473
  - DUODENUM
    - REVIEWS, 5349
  - LIVER, 5490
    - SURGERY, 5473
  - PANCREAS, 5352
    - DIAGNOSIS, 5350
    - REVIEWS, 5349
    - SURGERY, 5473

- TREATMENT
  - SEE THERAPY

- TRYPANOSOMIASIS
  - DIAGNOSIS
    - IMMUNOGLOBULINS, 5456*
    - IMMUNOLOGY, 5170
  - IMMUNOLOGY, 5512

- TRYPSIN
  - CHEMICAL PROPERTIES, 5049
  - DUODENUM
    - HORMONE EFFECTS ON, 5052
  - IRRADIATION, 5117
  - PHYSICAL PROPERTIES, 5049

- TUBERCULOSIS
  - CECUM
    - REGIONAL ENTERITIS, 5519*
  - GASTROINTESTINAL, 5462
  - ILEUM
    - REGIONAL ENTERITIS, 5519*
  - PERITONEUM, 5462

- ULCER
  - DUODENUM, 5216*
    - COMPLICATIONS, 5225
    - DRUG TREATMENT, 5218, 5233
    - PATHOLOGY, 5217*
    - VAGOTOMY, 5194*
  - ILEUM
    - DISEASES ASSOCIATED WITH, 5469
  - STOMACH, 5216*
    - ACIDITY, 5026*
    - BLEEDING, 5026*
    - COMPLICATIONS, 5232
    - DRUG EFFECTS ON, 5221
    - ENDOSCOPY, 5129*
    - ETIOLOGY, 5227
    - SURGERY, 5226

- ULCERATIVE COLITIS
  - SEE ALSO COLITIS

    - , 5442

- COLON
  - NEOPLASMS, MALIGNANT, 5331
- DIAGNOSIS, 5330
- DRUG-INDUCED
  - SIMULATION, 5334
- DYSENTERY
  - DISEASES ASSOCIATED WITH, 5327
- ETIOLOGY, 5328
- MALABSORPTION
  - LACTASE DEFICIENCY, 5326*
- MUCUS
  - GLYCOPROTEINS, 5332
- REVIEWS, 5329

ULTRASTRUCTURE
- LARGE INTESTINE
  - GLUCOSE, 4973
- LIVER
  - CIRRHOSIS, 5432
  - DIABETES, 5432
  - HEPATITIS, CHRONIC, 5394*
  - HYDROCARBONS, HALOGENATED, 5057*
  - HYPOTHERMIA, 4974
  - IRON, 5074*
  - NEONATE, 4953
  - NUCLEOTIDES, 4953
- LIVER INJURY
  - GALACTOSAMINE, 5071*
- STOMACH
  - ALCOHOL, 4947*

VAGOTOMY
- DUODENUM
  - ULCER, 5194*
- PEPTIC ULCER, 5220
  - BLEEDING, 5219
  - GASTRIN, 5194*

VILLI
- ATROPHY
  - RADIATION, 4959

VITAMIN B2
- BILIRUBIN
  - METABOLISM, 5068*

VITAMIN B12
- ABSORPTION
  - DIARRHEA, 5270*
  - MALNUTRITION, 5270*

VITAMIN C
- ABSORPTION
  - HORMONE EFFECTS ON, 4979*
  - SMALL INTESTINE, 4979*

VITAMIN D
- ABSORPTION
  - PHOSPHATE, 4989*
- CALCIUM
  - ABSORPTION, 4980*

VITAMIN E
- LIVER DISEASE
  - DRUG TREATMENT, 5388

VOLVULUS
- CECUM, 5300
  - SURGERY, 5298
- COLON
  - SURGERY, 5298
- ILEUM
  - MORPHOLOGY, 5323
  - SURGERY, 5323
- SIGMOID
  - DISEASES ASSOCIATED WITH, 5284*
  - MORPHOLOGY, 5323
  - SURGERY, 5323
- SMALL INTESTINE
  - NEONATE, 5251
  - SURGERY, 5251
- STOMACH
  - SURGERY, 5213

VOMITING
- ANTIEMETICS, 5475

WATER
- ABSORPTION
  - BILE ACIDS, 4986*
  - JEJUNUM, 4982*, 4986*
  - PROSTAGLANDIN, 4982*

WHIPPLES DISEASE
- ETIOLOGY
  - BACTERIA, 5280
- IMMUNOGLOBULINS
  - DEFICIENCY, 5279

ZOLLINGER-ELLISON SYNDROME
- ANGIOGRAPHY, 5125*

ZYMOGENS
- PANCREAS
  - CYTOLOGY, 4963

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